AN HBJ PUBLICATION

AUGUST 1984 / $2.00

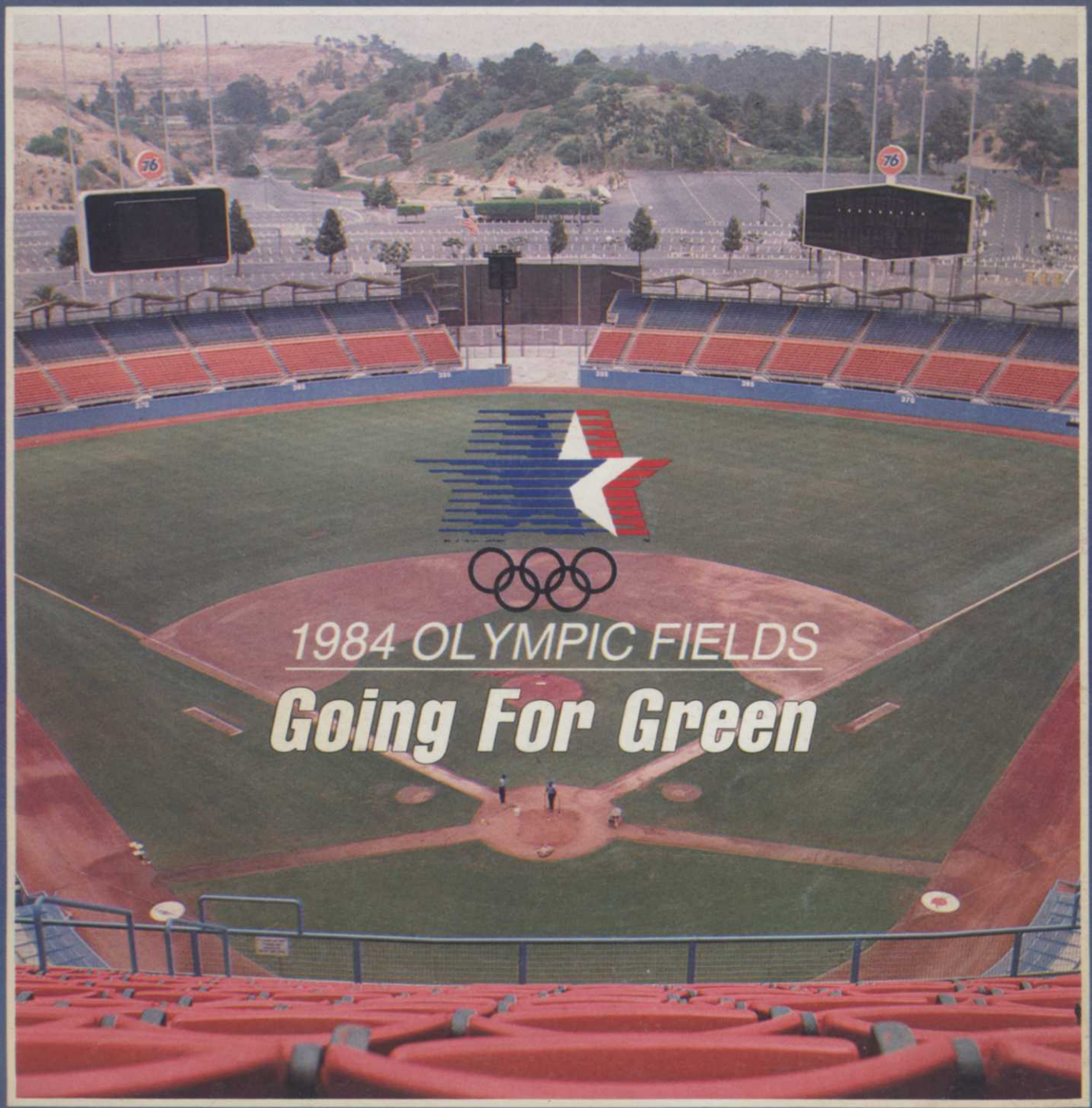
WEEDS TREES & TURF

The Magazine of Landscape and Golf Course Management Since 1962

Tall Fescues Move Strongly From Pasture to Turf

Thirsting for Answers—Solutions for Cutting Water Use

Olympic Preparation Pits Man Against Nature



Dodger Stadium, site of Olympic baseball.

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Nothing tops DURSBAN* Insecticide for stopping spring-emerging insects in turf. But unless you spray it again in late summer, you could be heading for a fall, come autumn. Because even the long-lasting residual action of DURSBAN won't last quite that long. So you could miss sod webworms and other tardy types.

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AUGUST 1984 VOLUME 25, NUMBER 8

WEEDS TREES & TURF

The Magazine of Landscape and Golf Course Management Since 1962

24 Going for Gold ... and Green

Dr. Kent Kurtz of Cal Poly, Pomona, describes from a turf viewpoint the fields hosting the athletes of the XXIII Olympiad. Each field manager has gone the extra mile to insure the eyes of the world will focus on turf befitting the world's greatest amateur athletes.

28 Thirsting for Answers ... The Solutions (Part II)

Last month, we looked at some of the problems facing the Green Industry due to shrinking water resources. This month, some solutions are offered by university-level research, irrigation company and industry association involvement.

44 Tall Fescues ..... Rising from Pasture to Turf

No longer is tall fescue being used for just forage, road stabilization and erosion control. An increasing demand has been put on it because of the overall economy, drought tolerance and ability to do well at reduced soil and fertility rates.

Dr. William A. Meyer of Turf-Seed, Inc., gives an in-depth look at the new and old tall fescues in the third part of the Turf Seed Series.

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by **Bruce F. Shank**, executive editor

Turf haulers fight ATCs in West

California has been a tough market for U.S. turf vehicle makers with the importation of Dihatsu, Sanfu, and other Japanese small carriers. Now the battle has gotten worse with the knob-by-tired, three-wheel all-terrain cyles by Honda, Yamaha, and Suzuki.

The ATC market is based upon volume, whereas the U.S. turf vehicle market is a specialized, relatively low volume market. Placed side-by-side, price can easily sway a golf course superintendent from the tough, boxy, rough-riding turf vehicle to the sporty, quick, freedom of the three wheelers from overseas. Prices can be three times greater for the domestic product.

Meanwhile, Club Car, Columbia Car, and Yamaha are offering an in-between type of hauler, a golf car with improved suspension and small bed, priced in the $3,000 range, or 30 percent more than ATCs.

Bottom line will be how long the ATCs last, what type of service buyers receive from ATC dealers, and what happens when the fun is replaced by the actual usefulness of the vehicles. In our November issue, we'll take a closer look at the ATC and the Green Industry.

Panel points out service trend

A panel, formed by the American Association of Nurserymen to point out trends five to fifteen years in the future, has pointed to an increasing "service-based" economy, motivated by two-income families with less leisure time. The "Point" Committee mentioned interior landscaping specifically.

The AAN committee's projection may be less than five years away. Chem-Lawn, Davey, Sears, Stanley Steemer, and Rollins have already made steps toward multi-service business. Interior landscaping still lacks a national service company, a market which Davey is said to be researching. Look for Davey and perhaps a franchise or two to develop in interior landscaping in the next eighteen months.

Mechanics can make or break you

Ray McMiken, president of B. Hayman Company, an equipment distributor in the Los Angeles area, often asks, "Who should be the second highest paid person on a golf course?" The answer is the mechanic who keeps the equipment productive.

When airlines negotiate with their mechanics, I listen closely before deciding which airline to fly. Parks, distributors, contractors; we all depend on equipment for our jobs. It makes tremendous sense to take advantage of every possible equipment training seminar by sending the head mechanic and perhaps part of his crew.

Equipment will be getting more advanced with hydraulics and solid state components. Manufacturers and distributors will be adding regional equipment maintenance and repair seminars as their equipment gets more complex. Don't miss these classes when they come to your area.

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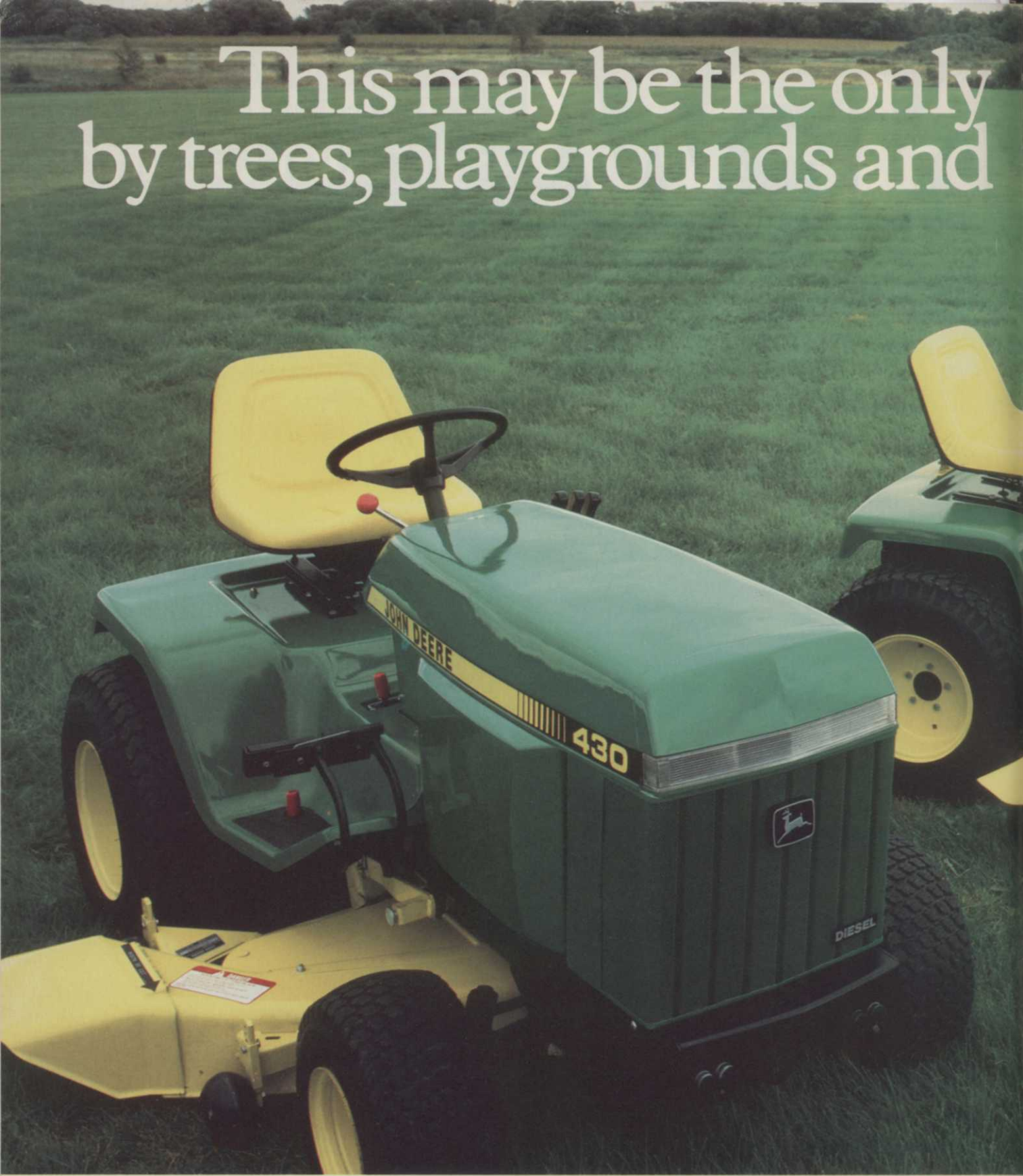

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line of tractors designed hedgerows.

hitch and a 2,000 rpm rear PTO. And a variety of attachments, including rotary tillers, snow blowers or throwers, front blade, thatchers, 3-point hitch mowers, and center-mounted mowers with 46-, 50- or 60-inch cutting width, depending on tractor.

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For the name of your nearest dealer, or a free folder on the John Deere lawn and garden tractor line, call 800-447-9126 toll free (1-800-322-6796 in Illinois) or write John Deere, Dept. 50/50T, Moline, Illinois 61265.

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PESTICIDES

Improper chemical use kills 546 geese

The Seawane Golf Club, Long Island, NY, agreed to a payment of $5,000 to the New York State Department of Environmental Conservation after being held responsible for the May 12 death of 546 Atlantic Brant, a species of geese that breed in the Artic but winter in the area between Massachusetts and Virginia.

It was the largest reported kill of water fowl in the Long Island area in recent history, according to Regional Wildlife Manager Harold Knoch who blamed the deaths on the improper use of diazinon, a pesticide used for grub control.

Knoch said there have been "four or five other bird kills in this area" in recent years due to diazinon poisoning in spite of recommendations that the pesticide not be applied where waterfowl are likely to gather, and then only when rain or sprinklers quickly dissolve the pesticide into the turf. The problem has become more noticeable, he added, since the mid-1970s when Brant in larger numbers began feeding on lawns and golf courses.

"The maximum fine could have been more," Knoch said of the penalty, "but they felt bad about it and cooperated."

CHEMICALS

EPA gives Orthene turfgrass approval

Orthene Tree & Ornamental Spray Insecticide has received EPA approval for use in the control of turfgrass insects. The insecticide is registered to control many species of armyworms as well as sod webworm, leafhopper, and greenbug.

In tests performed in six states over a nine-year period, Orthene proved successful in the control of armyworm infestations in dichondra, St. Augustine and bermudagrass. Orthene also was judged successful in the control of sod webworms in bluegrass, fescue, bentgrass and bermudagrass following tests in 14 states, according to a release from the Chevron Chemical Company.

Ted Coman, Chevron's product manager for insecticides, says Orthene kills foliage-feeding insects two ways, on contact and by ingestion, and is compatible with most commonly used fungicides. Coman notes that the insecticide spray can be applied without protective equipment or clothing, and workers can re-enter the turfgrass area as soon as the spray deposit has dried.

Because of its low toxicity, Orthene presents reduced hazards to fish, wildlife, and the environment, according to the company.

250 attend field day

Bill Rose points out features of a bentgrass green used for research during the Second Annual Turf Field Day in Hubbard, Oregon, in June. 250 people from more than ten countries attended the event. Shade tolerance plots are in the background. Turfgrass varieties from all seed companies are tested at the facility for shade, wear, low fertility, mowing height, and water use.

PESTICIDES

Florida restricts phenoxys, asks prenotification

After numerous complaints of crop damage from vegetable growers, the Florida Department of Agriculture and Consumer Services issued an emergency ruling designed to force applicators of phenoxy and dicamba herbicides to keep records and warn the Department before spraying.

The Department classified phenoxys and dicamba herbicides as 'restricted use' thus forcing applicators of these products to keep time and place records of uses. The Department took additional steps for applications made in four counties, requiring notification of the Department prior to application.

Vegetable growers blame drift and poor placement by farmers, ditchbank and aquatic weed sprayers, and right-of-way clearance crews for damage to crops.

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UPDATE

GCSAA has computerized calendar

The most up-to-date listing of national golfing events, including tournaments, turfgrass conferences, GCSAA chapter meetings and PGA events, is only a phone call away.

The Golf Course Superintendents Association of America now has available a national clearinghouse calendar of golfing events which will be kept up-to-date through the use of the Association's computer.

Also listed on the computer are LPGA events, USGA events, CMAA meetings and other organization meetings and events in the world of golf.

The toll-free GCSAA number, 1-800-GSA-SUPT, will get you a computer printout of current events. You can call the same toll-free number to have your event listed.

Callaway honored for service

Lionel F. Callaway, best known for creating the golf handicapping system that bears his name, has been named the first 1984 recipient of the National Golf Foundation's Outstanding Service Award.

"Lionel Callaway's contributions to the game go beyond his handicapping system, though that would certainly be enough (of an accomplishment)," said Joe Much, NGF executive director. "He is one of golf's true pioneers and is responsible for countless innovations and ideas to make the game easier for all."

Callaway, 88, was born in England, the son of a golf professional and golf course architect. He turned professional at the age of 13 and immigrated to this country four years later. One of his first stops was Boston, where he came up with the idea for an indoor putting game which evolved into miniature golf. Callaway also was responsible for combining outdoor miniature courses with driving ranges.

Callaway first used his handicapping system at local courses in North Carolina and Pennsylvania. Eventually it was adopted nationally.

"I made no money on most of my ideas," he said. "I prefer to call them my contribution to a game that has been good to me."

No praise or money, thank you

Ed Stimpson, Sr., a 79-year-old native of the Boston area is credited with inventing the Stimpmeter in 1935. The 36-inch gauge is used to measure the speed of putting surfaces.

Golf Digest reports that years after his invention, a friend suggested he would make millions if he marketed the idea, but Stimpson said he wanted nothing to do with the commercializing of his invention.

"Golf doesn't owe me a thing," he said. "I owe golf ... and I've had a marvelous life playing golf."

EQUIPMENT

Tractor sales rise; fuels recovery hope

An upturn in the sale of tractors this past April is giving the manufacturers of farm equipment hope the remainder of 1984. Tractor sales rose 15 percent in April compared with a year earlier, from 12,257 to 14,085. However, the farm-equipment industry is still concerned as the sale of combines remained at an all-time low.

Combine sales fell 15 percent in April to 457 from 539 the year before. For the year, combine sales fell 32 percent to 2,467, according to a report carried in the Wall Street Journal.

Exceptionally strong sales for the rest of the year would be needed to meet predictions of a modest increase in the farm-equipment industry since April is normally the strongest month for tractors, the report added.

CHEMICALS

Roundup beats proposed Milwaukee Co. ban

Legislation to ban the use of Roundup herbicide by public employees in Milwaukee County, WI, has been temporarily halted by county administrators, according to sources in Milwaukee.

The resolution, proposed by the local American Federation of City, State and Municipal Employees, was never signed by the County Executive, who had been out of town. Members of the County Board then rescinded the resolution. The County Board turned the matter over to a standing committee to examine the entire pesticide issue and report back to the board. Milwaukee sources say that the introduction of new legislation—which could include other pesticides—may be pending.

PEOPLE

Stalford takes post with 3-M Farms

Harry Stalford, Vice President Product Development of International Seeds, Inc., Halsey, OR, has accepted a position with the 3-M Farms in the Willamette Valley. Stalford was with International Seeds for 10 years.

"I enjoy the Valley. It's a beautiful place to live and I really love it," Stalford said of his decision to accept the

continued on page 14

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The compact skid-steer loader industry was originated by the Melroe Company over 26 years ago when we introduced our now world-famous Bobcat. And today we have three articulated loader models to help our customers keep ahead of their workload demands more efficiently.

The Melroe Bobcat has a commanding lead in sales over a wide range of competitors for many solid reasons:

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- Need another measurement of value? You'll get top-dollar consideration on a used Bobcat. So you get your money's worth twice with a Bobcat: When it's new and again when you trade.
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LANDSCAPE UPDATE

AAN's "Discover" gains momentum

Retail and landscape member firms of the American Association of Nurserymen are discovering new selling possibilities through the AAN's "Discover the Pleasure of Plants" promotion program, begun early this year.

Although the consensus of those members polled on the efficacy of the plan thought its success or failure was "too early to tell," they did say business trends seem to be on the upswing. Since the program's activity is designed, in part, to help extend the purchasing season beyond spring into summer and then reinforce the fall planting promotions, AAN spokesmen believe more indications of results should be available later on.

The "Discover the Pleasure of Plants" promotion program is designed by the AAN to coordinate with this year's international advertising action of the Nursery Marketing Council which began Memorial Day weekend this spring and Labor Day weekend in the fall, with network radio spots, tie-in commercial tape for local use and, new this year, ads both spring and fall in four major consumer magazines.

ALCA calls for entries

Exterior and interior landscape contractors will have a chance to compete in the Associated Landscape Contractors of America's 15th Annual Environmental Awards program.

All commercial landscape firms which devote a major part of their business operation to Landscape Contracting, Interior Landscaping, Erosion Control and/or Landscape Maintenance are eligible to enter their best example of landscaping. Membership in ALCA is not a prerequisite.

Complete information and entry forms for the program are available from ALCA, PO Box 48, Falls Church, VA 22046; (703) 821-8611.

"Big Island" awaits '85 ALCA show

The Kona Surf Resort Hotel in Kailua-Kona, Hawaii, will be the site of the ALCA Annual Convention and Trade Exhibit, Jan. 20-24.

Educational sessions based on the theme, "Profit in the Pacific" will be Jan. 21, 23 and 24. The trade show, featuring equipment and table top exhibits, will be Jan. 22 and 23.

There will also be plenty of leisure activities from golfing to snorkeling.

Informational brochures on the convention and trade show will be available shortly. Exhibit space is available now and can be reserved by calling the ALCA office, (703) 821-8611.

ASLA sets Phoenix meeting

"Legacy for the Future: Learning by Design" is the theme for the ASLA's 84th Annual Meeting and educational exhibit in Phoenix, Nov. 17-20. Keynote speakers will be Ralph Caplan, an industrial designer and author, Neal R. Pierce, syndicated columnist and Robert B. Riley, educator and author.

position with 3-M Farms which produces grass seed under contract to several major seed companies.

In a sense, Stalford is coming home. As a boy he began his career in the seed industry by working the very farms he is returning to.

STAFF

Hall joins WT&T as assistant editor

Ron Hall, 37, a former newspaper reporter and editor in Northern Ohio, joins WEEDS TREES & TURF as an assistant editor, it was announced recently. He becomes the third member of the editorial staff, joining Executive Editor Bruce Shank and Managing Editor Maureen Hrehocik.

Originally from Detroit, Hall studied writing and history at Wabash College, Crawfordsville, IN, before becoming a reporter with the Sandusky Register, Sandusky, OH. He also worked eight years as a reporter and editor with the Port Clinton News Herald, Port Clinton, OH.

Hall, who also has teaching and coaching experience (including a stint as an English teacher in Bogota, Colombia), hopes to strengthen the news sections of the magazine in addition to features and new trends in the athletic field and park maintenance industries.

PEOPLE

Names in the news

George Koziarz recently became president of the Illinois Landscape Contractors Association. Koziarz is associated with Synnestvedt Landscape Co., Glenview, IL, and has been in the landscape industry since 1969.

Greg Richards has been named product manager of turf chemicals for LESCO, Inc., Rocky River, OH. He replaces **Joe Winland**, who has been named vice president of commerical sales for Tru-Green Corp., East Lansing, MI. Winland will be based in Atlanta. Richards had previously been based in Landover, MD, working basically on LESCO sales to lawn care companies. **Vanessa Jensen** will assume some of Richards' duties.

From the Elanco Products Company, Indianapolis, comes word that **Salvatore A. Quattrocchi**, an agricultural chemicals sales representative in Arkansas, will be working in Minnesota, while **David A. Rausch**, who has been serving as market analyst, will be working out of the Bismarck, ND, area. **Mark I. Buroker** was re-

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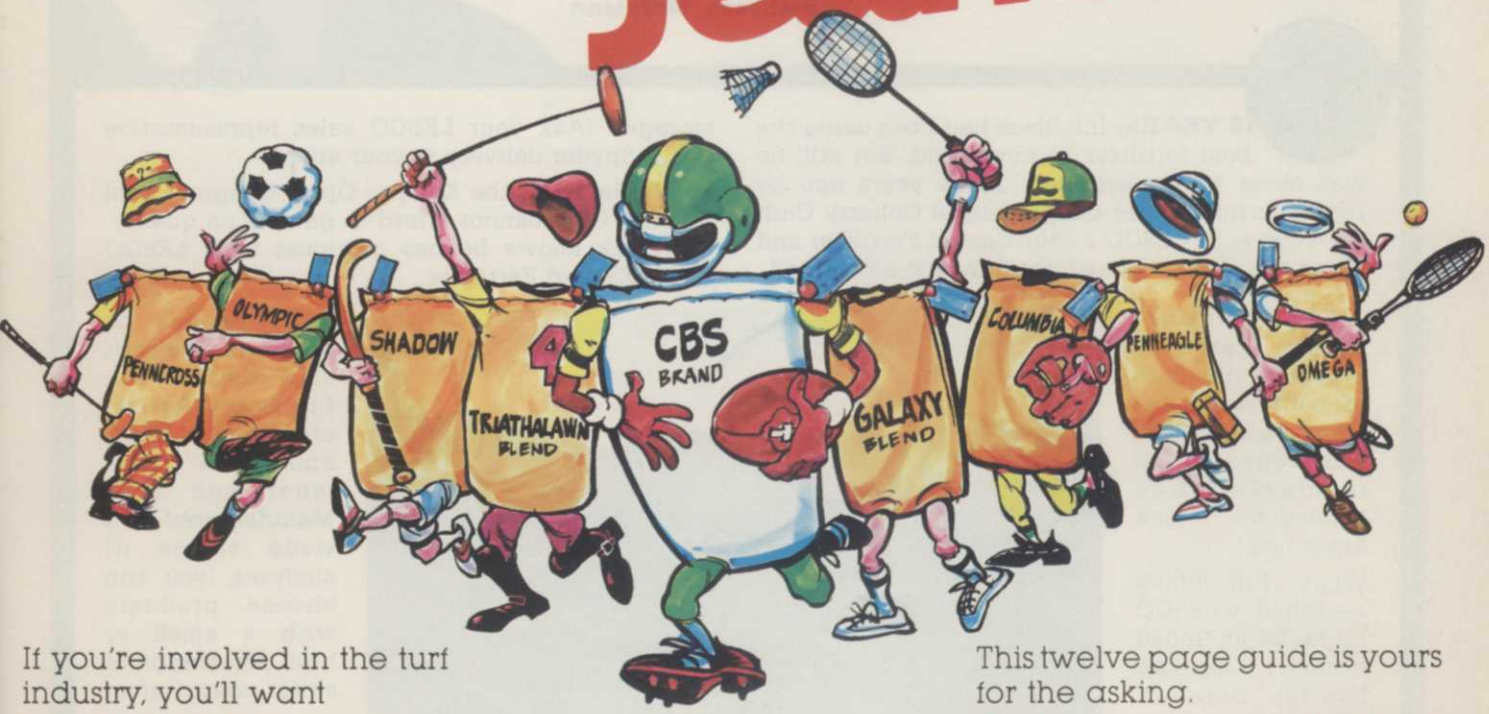
from Turf-Seed, Inc.



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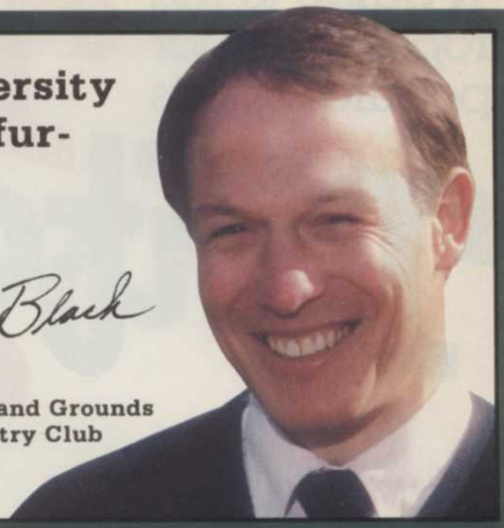
"I was impressed with the university test results, so I tried LESCO Sulfur-Coated Fertilizer on some small areas. Now I use it on all 36 fairways and the clubhouse grounds."

C. William Black

Bill Black, CGCS
Manager of Greens and Grounds
Congressional Country Club
Bethesda, Maryland



FOR 15 YEARS, Bill Black had been using the best fertilizer he could find. But still he was never totally satisfied. Three years ago he began fertilizing the Congressional Country Club fairways with LESCO Sulfur-Coated Fertilizer and found the efficiency and performance he wanted.

"LESCO Sulfur-Coated Fertilizer provided the best of both worlds — some quick release, but also the residual I was looking for," Black explained.

When Bill Black switched to LESCO he found an added benefit in the Spyder delivery method.

"It used to be you had to bring in the entire crew to unload the truck," Black said. "With LESCO Spyder delivery you don't even touch the product — you just have to make sure an area is cleared for storage." (Ask your LESCO sales representative about Spyder delivery in your area.)

As the home of the Kemper Open, Congressional Country Club cannot afford to gamble on quality. Bill Black knows he has a winner with LESCO Sulfur-Coated Fertilizer.

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cently named a marketing associate by Elanco. He joined the company in 1972 after graduating from Purdue University. Finally, **John R. Guthrie** was named a market analyst for international market research. Elanco is the agricultural marketing division of Eli Lilly and Company.

Ann Pang

Mike Schaefer

Mike Schaefer is the new vice president of sales and **Roger Meyer** the new vice president of engineering for the F.D. Kees Manufacturing Company, Beatrice, NB. Schaefer was the company's national sales manager while Meyer served as the chief engineer. Schaefer will direct the sales and marketing efforts for the entire Kees line of lawn and turf equipment. Meyer will be supervising all engineering and new product development.

Ann Pang, a graduate of Cal Poly, San Luis Obispo, is the new liason between the Orange County construction operations and the landscape

Karl Fiander

L. Donald LaTorre

architectural community, according to a release from Environmental Industries, Inc., Calabasas, CA.

Otto Pick & Sons Ltd, Richmond Hill, Ontario, Canada, announced that **Karl Fiander**, a graduate of Carleton University, has been appointed manager of the Alberta region. Fiander is vice president of the Canadian Land Reclamation Association.

L. Donald LaTorre has joined Engelhard Corporation's Specialty Chemicals Division as senior vice president, minerals. Prior to joining Engelhard of Iselin, NJ, LaTorre served as executive vice president of Velcro USA.

GOVERNMENT UPDATE

Supreme Court rules for EPA in long-awaited Monsanto decision

A long battle between the Environmental Protection Agency and Monsanto over use of "trade secret" health and safety data to support registration by competitors remains partly unsettled despite a June Supreme Court decision in favor of EPA.

The case was filed in 1979, heard by the Court this past winter, and took Justice Harry Blackmun four months to write the decision. The Court overturned a U.S. District Court decision calling EPA's data compensation arbitration process unconstitutional.

While waiting for a decision, EPA has held up pesticide registration applications using data originated by other companies. Existing registrations supported by "me-too" data have been threatened with nullification due to claims by data originators of inadequate compensation.

The Court ruled, however, a dissatisfied data originator can sue EPA for "just compensation" if the arbitration process results in an unacceptable figure. The Court ruled changes in the Federal Insecticide Fungicide Rodenticide Act(FIFRA) between 1972 and 1978 gave registrants an impression of confidentiality. Therefore, companies submitting trade secrets to EPA in that period could sue EPA for 'taking of property' if EPA used the data against the company's will. Most of Monsanto's data on Roundup (glyphosate) was submitted between 1972 and 1978. Data submitted to EPA before 1972 or after 1978 is subject to FIFRA-set arbitration rules.

EPA is waiting for the Court to rule on a similar case against it by Union Carbide. Justice Sandra O'Connor wrote in a separate opinion that she considered use of pre-1972 data as taking of property too.

Bottom line is EPA is still holding up registration of 'me-too' chemicals for the Union Carbide case, Monsanto can block EPA use of its data submitted between 1972 and 1978, and EPA faces another pile of lawsuits when data holders begin to contest compensation.

David Crossman, a Monsanto spokesman told *Weeds, Trees & Turf*, "The most important aspect of the case is the Supreme Court has recognized trade secrets as property. We would have liked the District Court's ruling to stand and for Congress to revise data compensation sections of FIFRA."

Government contractors beware

If you apply pesticides to Federal or state property under contract you soon may be forced to stop until an environmental impact statement based upon worst case analysis can be completed. Oregon and Washington contract pesticide applicators have been stopped from spraying lands managed by the Bureau of Land Management or the U. S. Forest Service by a Federal Circuit Court. Voluntary bans have been implemented by these agencies in other parts of the country as well. The Pesticide Public Policy Foundation calls this the most significant pesticide issue confronting the the Green Industry.

The Planting Hole

Research has shown absolutely no benefit from adding organic amendments to the planting hole backfill.

by Michael Dirr, Associate Professor, Horticulture, University of Georgia, Athens, GA

What could be simpler than dragging a six cubic-foot bale of peat moss across a half-acre lawn for the sole purpose of mixing it with the backfill around a newly planted red maple?

The answer, no peat moss!

Sound like heresy? Perhaps! I make this point to emphasize that recent research has shown absolutely no benefit from the addition of organic amendments to the planting hole backfill. In no case did amendments improve growth and in some reduced growth over backfill with no amendments.

What does this mean for professional landscape managers? Essentially it means dig a wide hole, not a deep hole, and place the native soil back around the plant. Let's examine the early research and its application for the landscape manager.

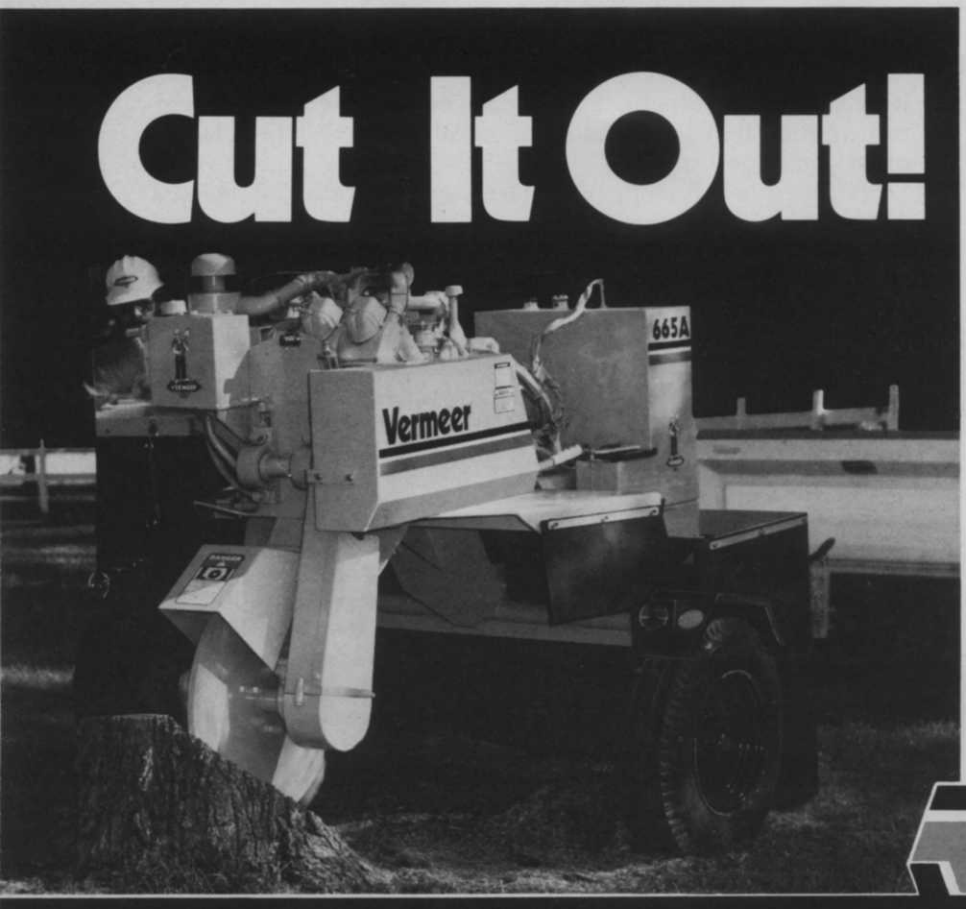
Whitcomb (Oklahoma), Pellett (Minnesota) and Corley (Georgia) working independently reached similar conclusions concerning backfill amendments. Pellett's work (1971) was the first to question the benefits of adding amendments to the backfill.

Two sites were selected and ten different soil amendments were studied. The test plant was *Lonicera korolkowii* 'Zabeli', Zabel blueleaf honeysuckle. The plants were evaluated over a two-year period.

There was no statistical difference in plant growth due to the use of peat, perlite, vermiculite or sawdust compared to plant growth in local soil at either planting site.

Schulte and Whitcomb (1975) reported that the growth of *Acer saccharinum*, silver maple, in a good, clay loam soil or a nutrient-deficient silt loam subsoil was as good as or superior to growth in amended soil. Amendments included various percentages of bark, peat moss, sand or vermiculite. Root development in the good, clay loam soil was vigorous and the root system extended well beyond the limits of the planting hole. Trees planted in soils amended with peat moss had fibrous roots but they did not develop beyond the amended planting hole.

There was a positive response to fertilizer applications in the clay loam soil. Forty pounds of a 10-20-10 fertilizer per 1000 square feet per month



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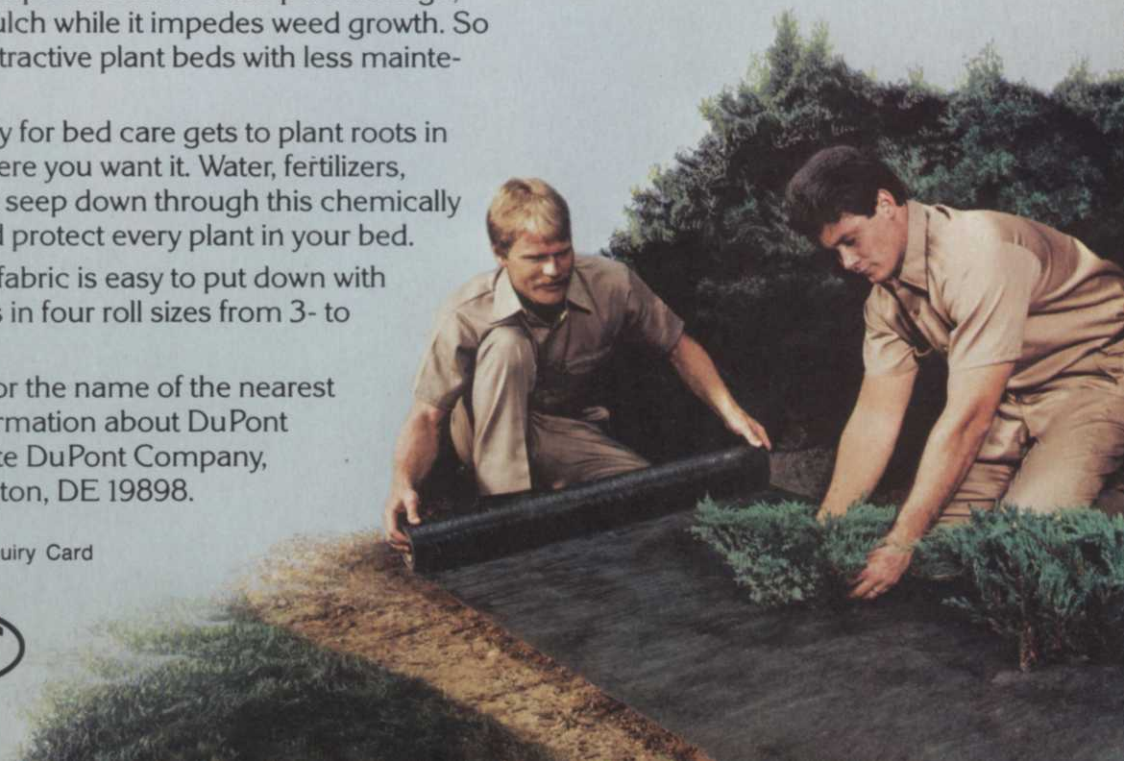

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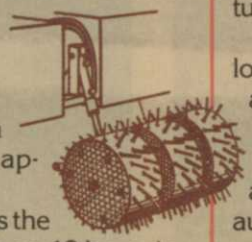

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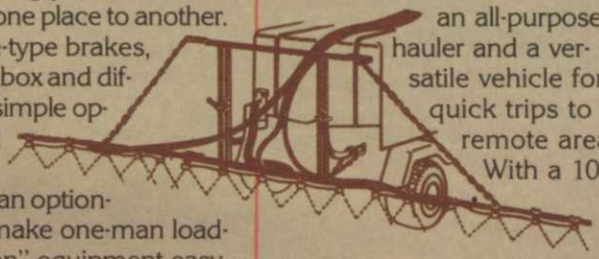

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Going for the Green: The XXIII Olympic Fields

by Dr. Kent Kurtz, professor of horticulture, California State Polytechnic University, Pomona, CA

Winning a medal at the Olympic games may depend on the condition of a turf surface. At the same time, field managers must fit the Olympics into their existing schedule of events. The result is a grueling struggle between man and nature.

The Rose Bowl *turf crew faced this the day after a motocross and just weeks before the Olympics began.*

Specialist spectators *Youngner, Kurtz, and Davis ponder the most critical field, the Coliseum following rebuilding.*

Despite the impending boycott by the Russians and other Eastern European countries, the Los Angeles Olympic Organizing Committee has continued to push for the best possible playing surfaces available for the competitors of the XXIII Olympiad.

Throughout southern California, managers and landscape personnel have spent countless extra hours feeding, grooming and putting the final touches to their fields. Several Olympic events will take place on natural grass surfaces and these areas must meet the strict and rigid standards of world competition.

Olympic turf *is spread throughout the Los Angeles area. Numerous turfgrasses and field construction designs are being used. Soccer, baseball, equestrian and track and field events must fit into the turf manager's regular schedule.*

These managers have had to fit the Olympics into their regularly scheduled events. Consultants have been called in to make sure the turf satisfies regular tennants as well as the Olympic Committee. This endeavor makes a unique story.

LA Memorial Coliseum

The opening and closing ceremonies and all track and field events will be held at the Los Angeles Memorial Coliseum, which had been constructed originally for the 1932 Olympic games.

The turf area of the Coliseum will be used mainly for shot put, discus, javelin, and hammer throw and ceremonial events. More television time will be spent on the Coliseum than other Los Angeles area fields used for Olympic competition. It is the showcase field.

To satisfy the athletes and discerning world eyes, the Coliseum management asked many turfgrass professionals to contribute their time, energy and expertise. They include the late Dr. Victor Youngner, who developed Santa Ana hybrid bermudagrass; William Davis, a sand field expert from the University of California, Davis; Dr. Henry Indyk, extension specialist from Rutgers University, New Brunswick, NJ; Dr. James Watson of the Toro Company; Dr. Victor Gibeault, University of California, Riverside; John Van Dam, University of California turf advisor; Steven Cockerham of the University of California, Riverside; and the author, a professor who has taught many of the area's superintendents and turf managers.

The Coliseum completed a major stadium renovation during the summer of 1982. This included replacing the common bermudagrass on a soil-based field with Santa Ana on a new sand-based field. The field architect was Richard Jenks, a member of the Jenks seed clan (Jenks-White Seed Co., now part of Jacklin) in Aurora, OR. Jenks' design, called the Hi-Play System, was also used for the Los Angeles Raiders practice field in nearby El Segundo. Indyk assisted Jenks with the planning and installation of the field.

Cockerham is the primary consultant for field maintenance, under the direction of the Coliseum's Larry Nielson.

Dodger Stadium

Baseball has appeared in the Olympic games seven times as a demonstration sport, the first in 1912 in Stockholm, Sweden. More than 40 countries will field teams this month, with the U.S. and Cuba as co-favorites.

Dodger Stadium, just North of downtown Los Angeles, features a Tifgreen hybrid bermudagrass field on a heavy adobe clay soil. The field is overseeded with Adelphi Kentucky bluegrass for the winter. Field superintendent Chris Duca moved with the Dodgers in 1959 from Brooklyn to Los Angeles.

The infield turf is mowed daily with a reel mower at one-half-inch. The outfield is cut at three-quarters-inch with all clippings removed. The primary nitrogen source is urea which is applied regularly every four to five weeks.

The automatic irrigation system in the outfield is set to water after all home games. Supplemental irrigation is used daily depending upon soil moisture and weather conditions. Duca tries to maintain root depths in excess of eight inches.

The infield is watered manually, as is the new "Dodger Dirt" which is now being used in the skinned infield areas.

The Rose Bowl

Soccer (football to the rest of the world) is the most popular sport on earth. The Rose Bowl in Pasadena will host the soccer finals. Sixteen out of the original 100 nations in the soccer competition will play off in the Rose Bowl. The U.S. automatically qualifies for the finals as the host country, but it has never won an Olympic medal for soccer, a sport dominated by eastern European countries.

Last year, the Rose Bowl's turf was replaced with a relatively new turfgrass from Australia, known as Excalibre or seashore paspalum. To help the paspalum survive a heavy schedule of events, including UCLA football,

the Rose Bowl game, concerts, graduations and even motocross, the field has been overseeded with Olympic tall fescue.

Frequent fertilization, aerification and sand topdressing in addition to careful irrigation were attempted to help the field recover from the stress of intense use. Olympic soccer requires a tabletop smooth surface so the ball will roll consistantly, thus the sand topdressing.

In late-June, based upon a recommendation from George Toma of the Kansas City Chiefs and National Football League field consultant, the decision was made to replace 75 percent of the field with Santa Ana sod from Pacific Sod. Pacific was also the supplier of the paspalum and stood behind the Rose Bowl in preparation for the Olympics.

Santa Anita

The equestrian jumping and dressage events will be held at Santa Anita Park race track in Arcadia. The competition will take place not on turf, but on specially prepared soil. The cross country equestrian events will be held at the Fairbanks Country Club in San Diego.

The Santa Anita soil areas (slides) are tiled for maximum drainage and worked into condition by dragging and watering. Soil needs to be stable for the 1,200-pound beasts and their riders to make sharp turns and to allow rapid acceleration for the timed events.

Frequent fertilization, aerification and sand topdressing in addition to careful irrigation, were attempted to help the field recover ...

USC field

Besides these major fields are practice fields such as Cromwell Field at the University of Southern California. Drs. O. R. Lunt and George Schmitz of Donald Eberhardt & Associates designed and built the field, replacing a silty clay soil with a medium particle sand and organic matter. It was then sodded with "Sports Blend", a combination of Tifgreen and Tifway.

Just in time

Preparing for the Olympics has demanded everything turf managers and turf science has to offer. Image is critical and playing quality even more important. With regular events to contend with, final preparations have been done almost at the last minute with daring atypical to the turf and landscape industries.

By mid-August, the Olympics will be just a memory and turf managers will refocus on their day-to-day challenges, helping other athletes perform at their best and safely on turf. **WT&T**

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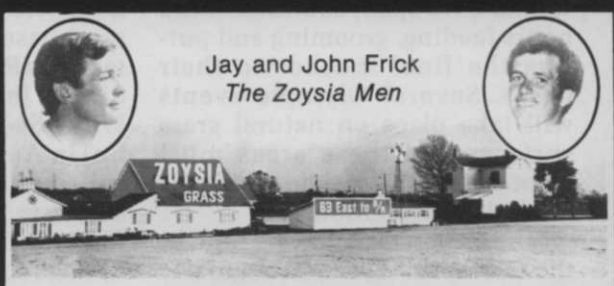

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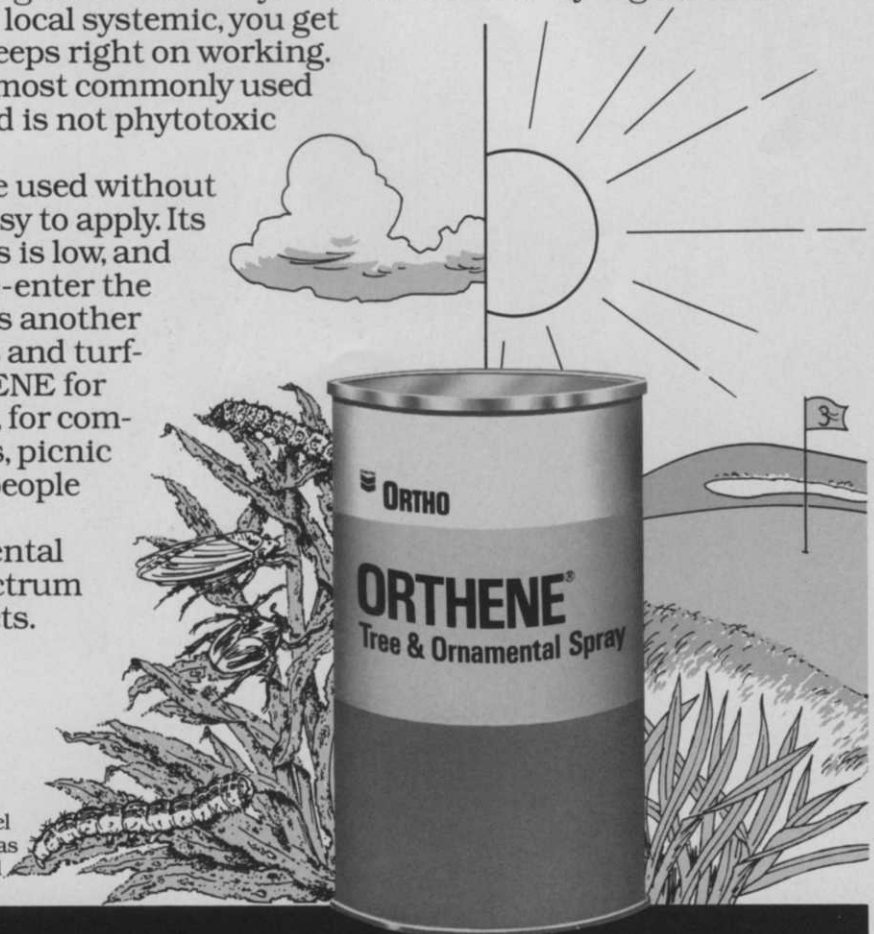

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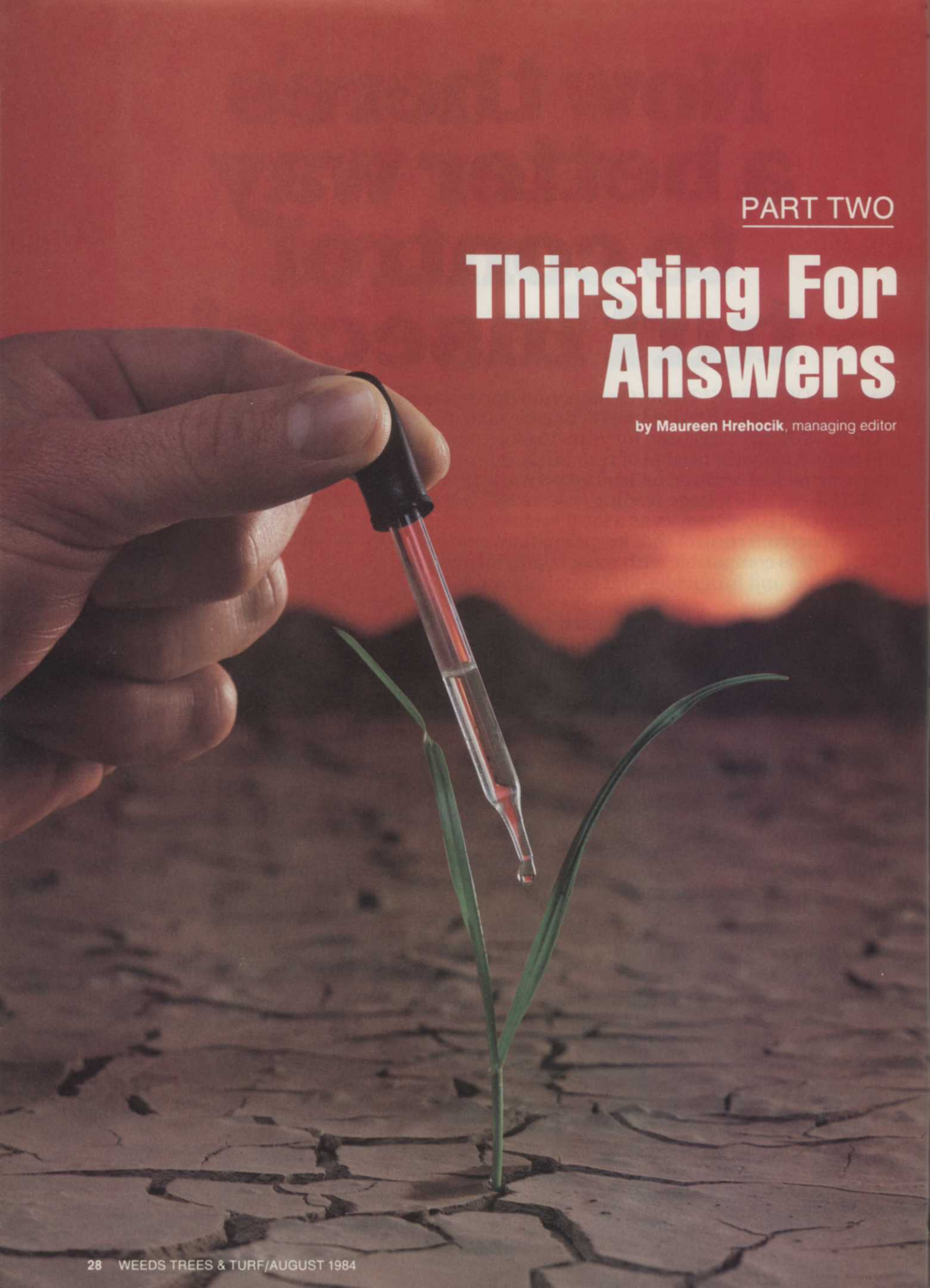

PART TWO

Thirsting For Answers

by **Maureen Hrehocik**, managing editor

One of the most critical challenges facing the Green Industry is an adequate supply of water. The lifeblood of this industry is slipping away through waste and pollution.

Last month WEEDS TREES & TURF began a two-part series on water use, conservation and quality in the Green Industry.

In "Thirsting for Answers, Part I," we examined water problems and issues in three key states; California, Texas and Florida.

In this second and final part, some solutions to these problems are offered through research, irrigation industry and Green Industry association involvement.

Development of low water use turfgrass is the kingpin in research currently being conducted.

University-level researchers across the country are currently trying to develop types of drought-resistant turf.

Backed up by concern for producing more efficient irrigation equipment from irrigation companies and financial and moral support from associations such as the USGA Green Section and Golf Course Superintendents Association of America, progress, slowly, is being made.

Tall cylinders *provide growing chambers for Dr. David Casnoff's root enhancement work study at the Texas A&M greenhouse in College Station. He is studying 11 warm season grasses.*

Research is kingpin in ebbing water woes

Dr. Jim Beard of Texas A&M, College Station, TX, oversees one of the largest turf water usage programs at the college level in the country.

With a staff of six, Beard's current research emphasis is water use rates, root enhancement, drought resistance and salt tolerance. His staff is doing interspecies work with 30 species. When that's complete, intraspecies work will be done.

"The future of the turfgrass industry rests on this type of research," Beard says. "It is a sobering responsibility and tremendous challenge."

Also, according to Beard, the number of man-year-equivalents (number of Ph.D-level researchers) doing work has doubled in the water area, largely due to the support of the USGA Green Section, this year to the tune of $332,000 with an estimated $3 to $4 million being spent in this area in the next eight to 10 years.

"When I first started my work back in the '60s, I had a budget of $2,000," says Beard. "Our USGA grant this year is $85,000."

Add to that the $90,000 in capital Texas A&M University has supplied and a half-a-million dollar physical plant, and Beard's operation is impressive.

Work is done on the 14-acre turfgrass research farm on the A&M campus. Field and plot manager Doug Dahms is responsible for its overall operation, mowing and fertilizing.

Root enhancement

Dr. David Casnoff is a post-doctoral student working with Beard in the area of root enhancement and stomata, the parts of a plant that allow water to enter and exit the leaf.

He believes the key to turf water usage is in the root system.

Casnoff is looking at the maximum root growth of 11 warm season grasses including Tifway; Tifgreen; FB119; Tex Turf 10; Texas Common St. Augustine; common centipedegrass; Argentine bahia; Adalayd sandknot grass; Emerald and Meyer zoysia; and Texoka buffalograss.

"We're not only trying to describe the difference between growth rate, but also how different species respond during spring when in their maximum growth period," explained Casnoff. "The ones that have more new root tips at a lower depth will probably have more active surface area for uptake of water."

Casnoff is also doing research with stomates.

"Stomates could possibly tell us why some grasses use more water than others," Casnoff said. "We know the size and number of stomates on the plant leaf are inversely related to each other, but we don't know whether or not it's better to have more or less."

Casnoff's work dovetails with turfgrass stress work research associate Steve Griggs is doing.

"Steve will have the low water use data and I will have stomate data. We can combine the two, and hopefully, come up with some important discoveries. At this point, the negatives are as important as the positives."

Griggs is a research associate in charge of testing humidity, dewpoint and light in the university's turfgrass stress chamber. Known environmental conditions can be created in the chamber which holds individually planted pots or lysimeters, of different species of grass.

Griggs said denseness in grass is becoming more important than stomata.

"Drought tolerance and water use are two different things," Griggs explained. "Buffalograss doesn't need a lot of water, but it will use water if it's available."

Griggs' daily routine includes weighing the lysimeters to calculate grams of water used. Cutting height is also important. Three replications per week are done of several cultivars of different turfs—mainly warm season grasses.

Sam Sifers, a retired colonel with a degree in history, is another research associate involved with minimal maintenance turfgrass—water, labor, energy and equipment.

Sifers set out to prove grasses with low nitrogen grow and perform as well as grasses with a high nitrogen content to give breeders parameters to judge turf.

"I eventually want to deny nitrogen totally and see what happens," Sifers explained.

His work entailed studying four bermudagrasses that required high medium and low doses of nitrogen—Midway (high); Tifgreen (medium), and TexTurf 10 and FB119 (low).

"We analyzed many different aspects of the grasses; shoot density, spring green-up, shoot growth, things like that."

Spring root decline is another area that Sifers is involved with.

Beard discovered the phenomenon of spring root decline—the grass turns brown above ground, but the roots don't stop growing—in the university's rhizotron, an underground

Dr. Jim Beard *heads one of the largest turfgrass water use research programs at the college level in the country.*

Sam Sifers, Texas A&M, *College Station in the greenhouse with growing boxes that chart root growth, simulating conditions of the university's rhizotron.*

growing chamber that allows the roots of live, growing grass to be seen from behind glass-like walls placed in the ground. (Texas A&M's rhizotron was the first in the world and is only one of seven that currently exists). Beard describes the phenomenon as the most significant discovery of his career.

Sifers has duplicated the rhizotron conditions in boxes in the greenhouse to duplicate warm/hot springs.

"We've not really found any decline," he reports. "With a gradual warming trend, there seems to be no effect. That could be one reason why superintendents have such a hard time from year to year. One season the grass seems to die, the next it doesn't," said Sifers.

"Stomates could possibly tell us why some grasses use more water than others."

—Casnoff

The next phase of Sifers' experiment will be Carbon-14 testing to pinpoint at exactly what temperature spring root decline is halted. He'll also study the effect phosphate has on the vegetative establishment of grasses. Sifers has already found with stolons that phosphate at three pounds per thousand square feet gave the fastest establishment of grass. He will next test phosphate with sprigging and sodding.

Kisun Kim, a graduate student studying under Beard, completed a comparative evapotranspiration (ET) rate study of 11 warm season grasses under non-limiting (watered everyday) soil moisture and progressive water stress conditions.

He found that, in general, tall fescues used more water and zoysia, bermuda, and buffalograss used less. There was a higher ET rate when the leaves were erect, shoot density was low and there was a high leaf area. St. Augustine and Adalayd had the highest evapotranspiration rate among warm season grasses. Emerald zoysia, buffalograss, centipedegrass and Tifgreen showed a low evapotranspiration rate. The conclusions of Kim's study were that zoysia species, centipedegrass and buffalograss can be recommended as prospective species when water saving is a high priority.

Those grasses which had a low vertical leaf extension rate, high shoot density, low leaf area and prostrate growth habit, had a low evapotranspiration rate. All grass species showed higher ET rates when maintained at their respective optimum nitrogen level and cutting heights, primarily due to the resultant, more rapid shoot growth.

Wallace Menn, an instructor in the A&M turf program, as part of Beard's overall turf water use research, did a four-year study of St. Augustine using Cutless and Embark growth regulators.

He sprayed the lysimeters with dif-

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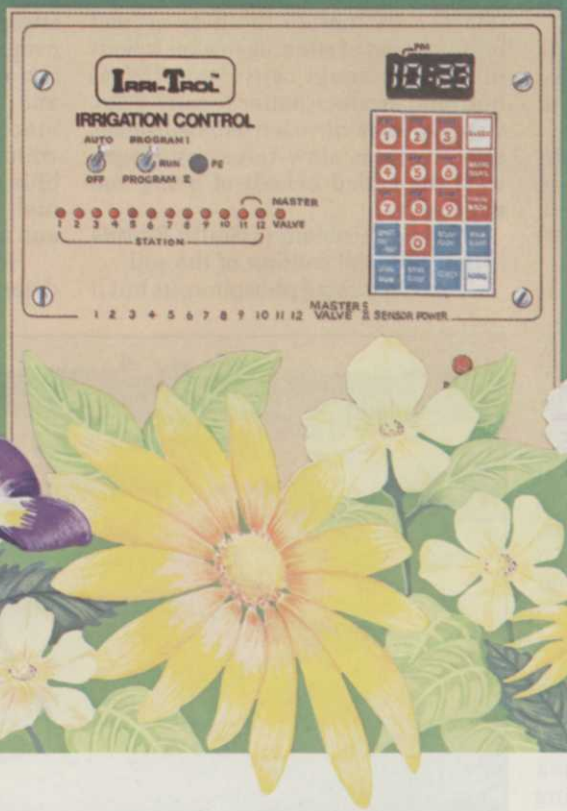

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ferent rates of the regulators and weighed them every 24 hours. He found growth regulators can save 20 to 30 percent in water use. Results from studies with bermudagrass were not as significant.

Salt tolerance

At the A&M research center in El Paso, TX, Dr. Garald Horst is evaluating zoysias, St. Augustine and bermudas for salt tolerance and water use rates. He expects the research to go on for another two years. Bluegrass, tall fescues and ryegrasses have been completed.

Horst conducts his salinity tests with grasses bred by Dr. Milt Engelke at the Texas Agricultural Experiment Station, Dallas.

"We have come up with some good germ plasms for salt tolerance, but the tests need some refinement and then we will test again. Horst analyzes 20 cultivars of each variety.

Ninety percent of Horst's work is oriented toward urban use.

"I think education and public awareness is the way to go," Horst maintains. "Lots can be changed by just altering people's water habits."

Horst also sits on the El Paso Park Board which oversees 630 acres of park land, and made a presentation to the board on water conserving grass.

"People are amazed that you can use less water and less fertilizer and still have the same quality grass."

University of Florida

Quantity of water isn't the problem in Florida, which averages 50 to 60 inches of rain a year. Quality is a problem. Because the soil is sand, there is a constant threat of chemicals leaching into the groundwater supply.

Still, Dr. Bruce Augustin of the University of Florida Institute of Food and Agricultural Sciences, Ft. Lauderdale, is trying to find ways of drought conditioning turf. He is studying nitrogen and potassium by taking recommended rates and going lower under different irrigation levels which include: daily (the type the typical homeowner would use) evapotranspiration replacement (twice a week or best "guestimate" of when to water); and wilt only (irrigates only when 30 to 50 percent of the turf plot is wilting.)

"The thrust of my work is on visual tests and common sense," says Augustin.

His testing has found that irrigation can be limited to an as-needed basis instead of sticking to a set schedule (which could cause over-irrigation) and produce better results. Also, water soluble nitrogen can be used as effectively as slow-release nitrogen with the added benefit of being less expensive.

Another problem in South Florida is the chemical content of the soil.

"We have some phosphorous but it doesn't move in the soil," said Augustin. "Nitrogen and potassium have to be added on a regular basis."

Augustin uses a Troxler density gauge for measuring moisture in the soil.

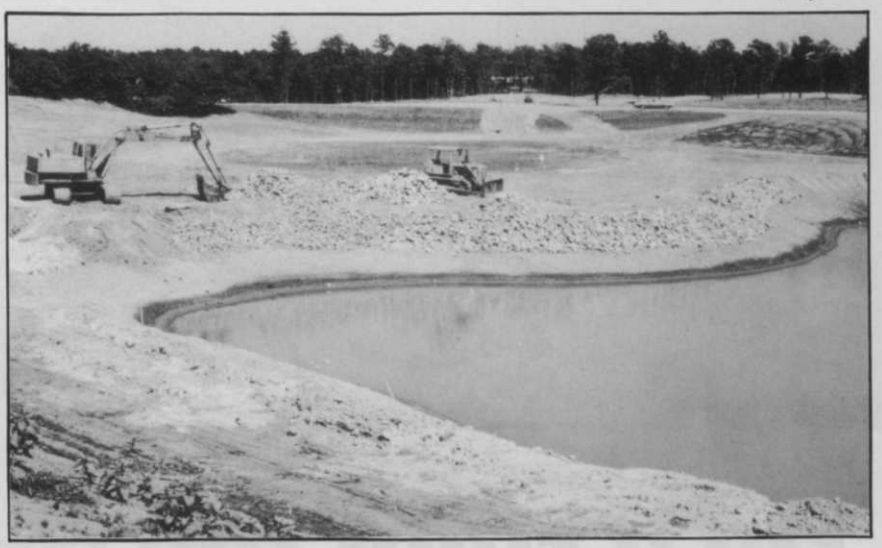
"I've found that homeowners and superintendents can tell how many minutes they've watered but not how many inches," explained Augustin. "In water conservation, the latter is more important."

University of Nebraska

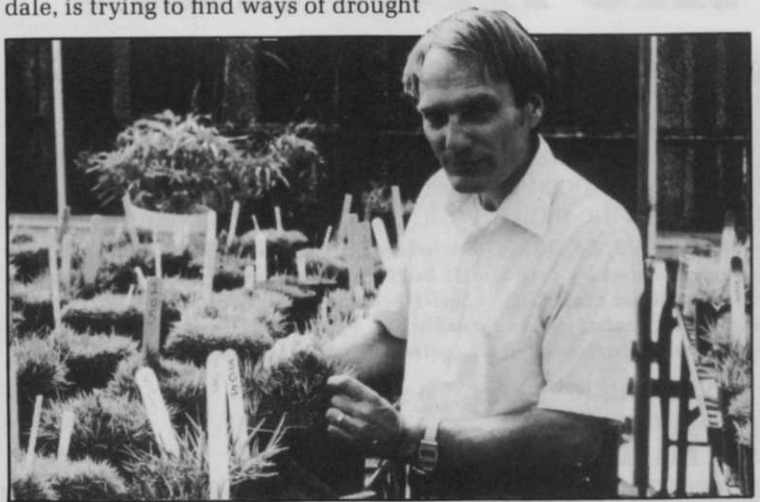
Dr. Robert Shearman at the University of Nebraska is trying to determine evapotranspiration rates for cool season turfgrass species and cultivars and is looking at drought avoidance mechanisms in the same grasses which include tall fescue, Kentucky bluegrass, fine-leaved fescues, perennial ryegrasses, creeping bentgrasses and annual bluegrass.

He has overseen the work being done at Nebraska, another large uni-

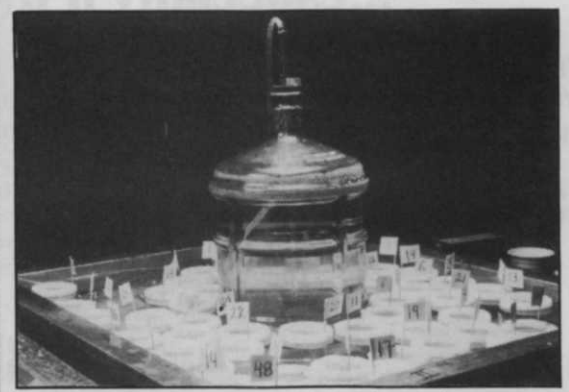
continued on page 36



Surface water at Dennis Highlands *is piped into a retention pond in a low area of the course for future irrigation purposes. The pond also reduces wind evaporation of the water and adds to the surrounding scenery.*



Dr. Garald Horst, *Texas A&M, El Paso*



Turfgrass plants *are tested for their tolerance of salinity levels at Texas A&M, El Paso.*

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Lakewood Country Club, CO
Pinehurst Country Club, CO
Atlantis Country Club, FL
Cypress Pines Country Club, FL
Deer Run Country Club, FL
DeLand Country Club, FL
Emerald Hills Golf Course, FL
Englewood Country Club, FL
Ft. Myers Country Club, FL
Golf Hammock Country Club, FL
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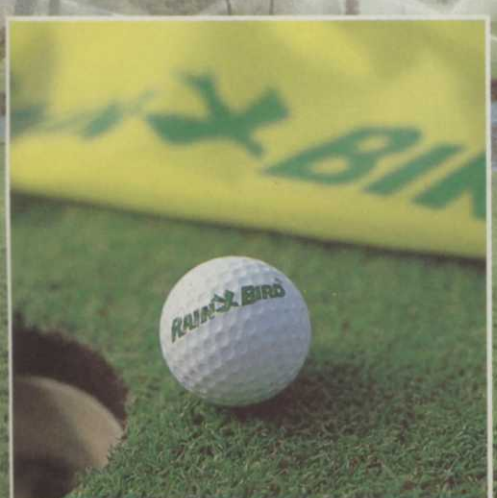

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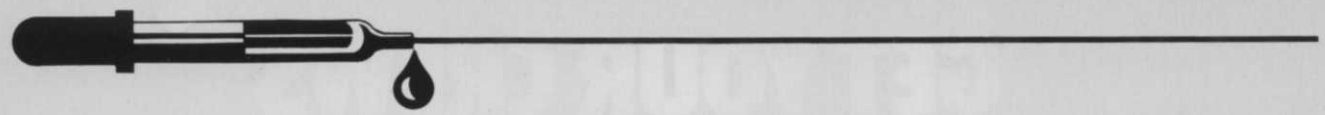

versity-level study comparable to Beard's of A&M, for the past nine years.

"With the ET studies, we're looking at those grasses under optimum conditions, such as the best mowing height and best nutrition regime for each species and under uniform conditions. The key is trying to characterize the ET under cool season growing conditions."

Shearman's preliminary findings relating to Kentucky bluegrasses are: there is a wide range of water use rates in Kentucky bluegrasses with the cultivars or varieties differing greatly.

Shearman is also using modeling to predict ET rates.

In the Modified Penman method, various mathmatical equations or models can be used to predict ET rates.

"What happens is that we use climate data to predict what the ET should be for the plant. In determining the ET on a particular day, we can also calculate what we predict it to be and then compare the two and come up with an equation or model that a turf grower could use to schedule irrigation. Growers can then plug this information into their own computers and adapt it to their own crops."

The department also found growth regulators can significantly reduce ET rates compared to plants that hadn't been treated.

"We found a 25 to 40 percent reduction in water use after 14 to 28 days of treatment.

"Overall, we're looking for ways on a short-term basis to reduce water uptake through cultural practices," concludes Shearman. "On a long range, we're trying to identify grasses with low ET rates and deeper, more extensive root systems under turf conditions and the ability to redistribute the root system with changing soil moisture. This will tie in with our long range goals of breeding low water use, drought avoidance grasses."

University of California, Riverside

Editor's note: Much of the low water use turf research in California has been done by Drs. Victor Youngner and Victor Gibeault. Two weeks after WEEDS TREES & TURF interviewed Dr. Youngner for this story, he died of a heart attack. Because of the timeliness of his comments and the commitment Dr. Youngner showed to this industry over the past 30 years, his comments have remained in the story.

In 1966, Dr. Victor Youngner of the University of California, Riverside, released a bermudagrass cultivar he developed called Santa Ana. At the time it was hailed for its tolerance to smog and ability to continue growth right into the cool winter season. The fact that it was a water efficient grass was noted, but at the time, smog was a bigger danger than water consumption.

That has changed.

It was in the '60s, that Youngner began his research with the now retired Dr. Al Marsh, to determine the water requirements of turfgrasses. They chose two warm season grasses—St. Augustine and common bermuda and two cool season—Alta tall fescue and Merion Kentucky bluegrass. The two consecutive studies were done over several years. The study found warm season grasses to use much less water with virtually no effect on turf quality. Fescues also did well. Bluegrasses were stressed. The Youngner/Marsh test was the first time this data was produced.

This year, another Youngner zoysia cultivar will be released called El Toro. This is another turf with low water requirements.

Ongoing research, supported by the Metropolitan Water District, is looking at the survival ability of several grass species under severely reduced water levels. They include three warm season grasses (Santa Ana bermudagrass, *paspalum vaginatum* (Adalayd and Excalibur) and Jade zoysia) and three cool season (a blend of several bluegrasses, a blend of several ryegrasses and Alta tall fescue.)

Wetting agents

Studies done by Dr. John Letty, also of the Riverside campus, on wetting agents, concluded that when soils repel water for whatever reason, (organics, thatch build-up, etc.) surfactants have been found to allow better water penetration.

Youngner agreed.

"Wetting agents are of use in water conservation to avoid runoff in areas with hydrophobic soils or thatch," he said.

Alternatives

Youngner's colleague, Dr. Vic Gibeault, an environmental horticulturist with the University of California Agricultural Extension, Riverside, is focusing his current work on studying alternative plant materials that would use less water than turf.

The facts tend to support this research.

In Southern California, where 60 percent of the state's population lives, 3.1 million acre feet of water is used by 12.1 million people. That figure can rise to as much as 3.6 acre feet. With the loss, however, of part of its Colorado River supply in a few years because of a water rights dispute, Gibeault explained that that would put the Southern California water supply right on line—no surplus.

"Because we would not be dealing with a surplus situation, restrictions could be placed on the water supply at any time."

There is also an estimated influx of 3 million people coming into the state in the next 16 years; a whopping 25 percent population increase.

"We started looking at turf usage and came up with 1.4 million acres of turf in California," Gibeault said. "Of those acres, 65 to 70 percent are residential and 35 percent are professionally maintained such as golf courses, parks, cemeteries and military bases. Lots of water is being used to irrigate turf."

"About five years ago, we started water awareness programs with those in the professional turf community. Our goal is to paint a long-term scenario. The professional industry is recognizing the problem very clearly. Some facilities have changed from cool to warm season grasses because of their water-saving qualities. Homeowner awareness is a great problem."

Gibeault also explained there's some hesitancy among golf course superintendents because of the dormancy of warm season grasses. Much of the zoysia work at the U of C, Riverside, is aimed at finding cultures with less dormancy to make the grass more appealing and acceptable aesthetically.

In the 1.4 million acres of turf in Southern California, within each area, such as golf courses and parks, if water use areas were identified, you'd come up with about 50 percent of the area in existing grasses. Gibeault maintains these areas don't "need" to be planted in grass.

"We plan on studying alternatives that use less water and are just as pleasing to look at," he said.

Gibeault feels there's an issue that even overrides the type of turf selected in areas where water is precious—and that's irrigation equipment design.

"We always have to deal with the driest spot. If a system isn't designed well it wastes a great deal of water. Up until now, water has been too cheap to go with a more expensive system. In most cases, we're using twice as much water as we really need."

Major irrigation companies in the U.S. couldn't agree more.

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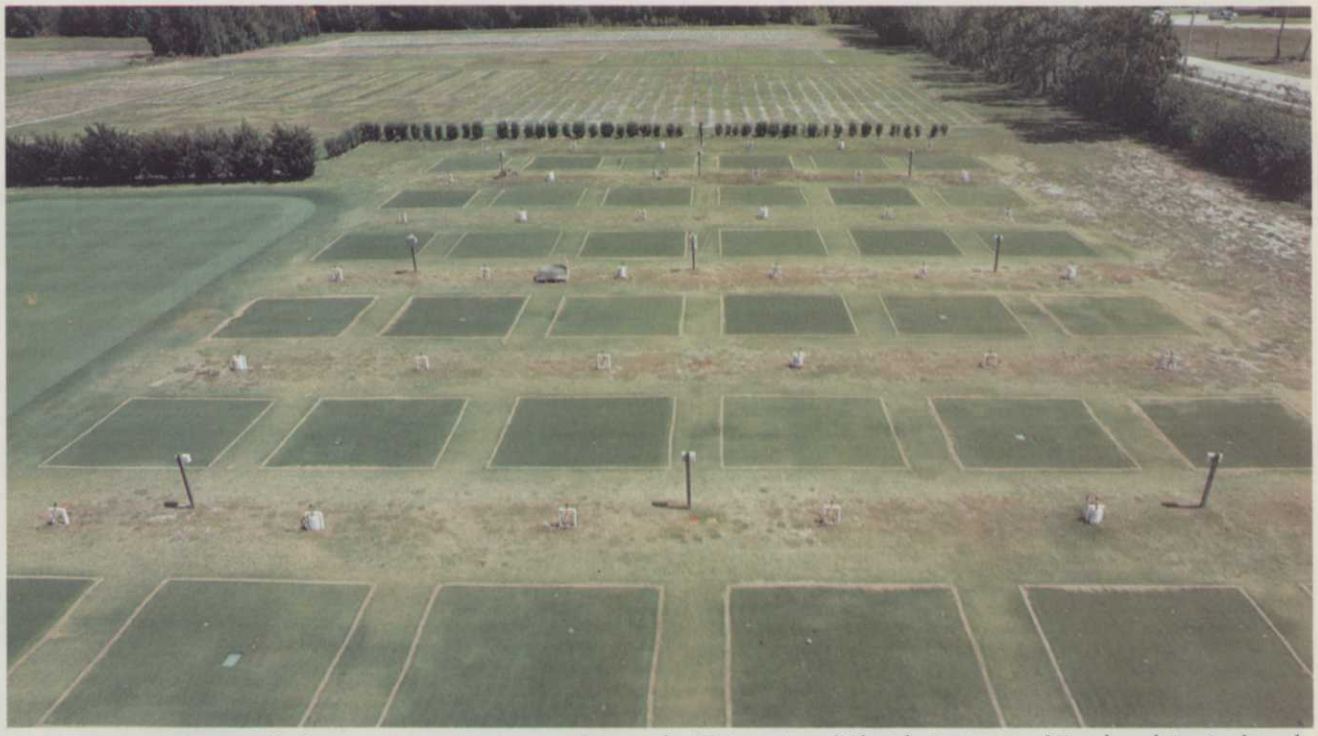


Moisture sensor-controlled *irrigation on turfgrass plots at the University of Florida Institute of Food and Agricultural Sciences, Ft. Lauderdale, under the direction of Dr. Bruce Augustin.*

Irrigation: putting water where it's needed when it's needed

One area where water conservation awareness is a top priority is in irrigation equipment manufacturing companies.

The overriding concern is convincing people that a professionally-installed irrigation system is one of the best and most efficient ways to put water where it's needed and only when it's needed.

Ninety percent of all irrigation companies in the country are located in California; that includes three of the largest, Toro, Buckner, and Rain Bird. Located in a Dallas, TX, suburb is another, Weather-matic.

Rainbird

Rainbird's Mike Baron is product development manager and says the company's philosophy is to make its products more efficient.

"Water conservation is very important to us," says Baron. "We don't want to wait until government mandates come down before we start confronting the problem. We (irrigation industry) will probably be targeted first (for any type of restrictions)."

Baron said there are two schools of thought—one is 'I'm going to water less but stay wasteful" and the other, 'I'm going to water more efficiently and make it do more.' The latter is what Rain Bird and other irrigation companies espouse.

"What it boils down to is the selection of equipment designed so as to avoid waste and the proper installation and maintenance."

—Putnam

Baron also believes the manufacturer must play a role in educating landscapers and contractors in the latest in equipment and in the type of equipment that would best suit their needs and those of conservation.

"In 1982, we developed a pressure compensating bubbler installed on a fixed riser," said Baron. "We determined the reason why it hadn't taken off faster with contractors was because it was new, installation was different and they were wary of it."

From January through April, the characteristically slow season for irrigation contractors, Rain Bird provides distributors and managers with slides and notebooks to educate their contractors on the latest methods and equipment.

The reception to the pressure compensating bubbler has improved considerably.

"Pressure regulation is the key because it allows transition from the design to whatever the contractor has planned for it. This type of bubbler is able to balance the precise amount of water coming out."

Baron pointed out the controlling system is also important.

"With the new solid state designs, you can be more precise with when you want to water than with mechanical dials. The slight fluctuations (in mis-timed controllers) do add up."

Rain Bird was the first irrigation manufacturer to have matched precipitation rates across nozzle sets, which means the amount of water going onto an area is the same regardless of the trajectory pattern.

The Toro Company was the first to introduce matched precipitation rates, but Rain Bird was the first to match it across sets—saving designers time and money, according to Baron.

Toro

John Skidgel, golf marketing manager of Toro Irrigation, Riverside, CA, agrees the secret to efficient irrigation is in the controller, and at press time, the company was scheduled to introduce a new one.

"The future of the industry is computerization," predicts Skidgel. "We already have gotten away from drawing boards and use computer-aided design for our systems. The future of our business is meeting the needs of different groups and doing it with conservation in mind and still maintain a nice-looking turf."

Buckner

At Buckner Sprinklers in Fresno, CA, energy conservation is as highly regarded as water conservation in the company's irrigation systems.

Sprinklers and valves requiring less pressure require less horsepower and therefore less electricity.

The company, according to golf marketing manager David Truttmann, is also incorporating in its system design, a reduced angle of trajectory so that water gets to the soil faster and that there is less of chance for the wind to carry off water spray.

Buckner's controllers have their own video control system which permits watering only when necessary.

They are also teaching designers and users about the equipment and what equipment works best in various situations.

"Energy and water conservation have always been a concern to the ag industry, but only recently have they become important to turf," commented Truttmann.

Weather-matic

Charles Putnam is vice president of sales for Telsco Weather-matic, Garland, TX, and is incoming president of the Irrigation Association. He worries about the industry "over technologizing" itself.

"We need to educate the public to put water where it's needed," says Putnam. "Even if it's inexpensive, an automatic system is better because it's more efficient."

Seventy-five percent of the company's business is in the commercial market and Putnam says business is great.

Weather-matic fully supports an irrigation licensing law that went into effect in 1973 and is the most advanced law of its kind in the country.

The Texas Board of Landscape Irrigators was one of the driving forces behind it.

"Basically, it protects the consumer and protects the supply of potable water," Putnam explained.

Of the 900 would-be irrigation contractors who take the test, only about half of them pass. The test includes designing an irrigation system with water conservation in mind.

Putnam outlined the company's philosophy on water conservation.

"What it boils down to is the selection of equipment, designed so as to avoid waste, and the proper installation and maintenance."

Putnam also believes that down the road controllers will become obsolete.

"Systems will be developed that waters only when the ground needs it," he said.

The company's Rain-stat comes close to that. The device overrides the controller so that when it gets to a certain level of rainwater, it turns the system off.

"In the future we'll see more input from landscape architects and local codes. These are the things that will dictate water usage. There'll be much greater municipality control," Putnam concluded.

Drip irrigation

Drip irrigation, (water comes out precisely where the emitter is with no spray) while prevalent in the agricultural industry, is not as popular in the landscaping profession.

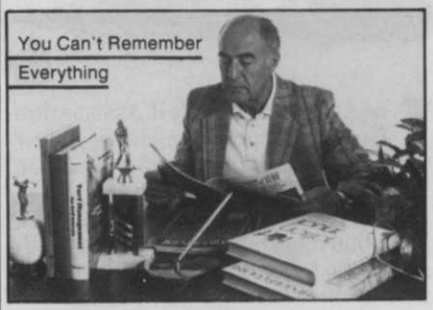
Skidgel from Toro says that most landscape areas are well-trafficked and that having drip emitters in those areas would not be practical. Toro, does, however, market a brand so its distributors will have it to offer customers.

"It (drip irrigation in landscaping) is a coming thing, no doubt," Skidgel said.

Rain Bird is making clear its position in the drip market. Says Baron, "We have a line of drip irrigators and some lines under development. We want to be in the forefront of products using localized irrigation."

Weather-matic's Putnam is more pragmatic.

"An increase in water rates will increase interest." **WT&T**



Four Books Superintendents Should Not Be Without

Golf course superintendents no longer have to buy or search through general turf books for answers to course problems. The following four books provide a powerful backup for superintendents, and they are written with the superintendent in mind.

Turf Management For Golf Courses
by James B. Beard

Beard's *Turfgrass Science and Culture* is the leading basic textbook for turf. In his new book, Beard devotes his attention specifically to golf turf, both cool-season and warm-season. The result is perhaps the single, most important book a golf course superintendent can own.

Beard begins with the history of golf, proceeds to course construction, devotes the majority of the book to maintenance, and then completes the reference with information on management, tournament preparation, buildings, and more. **646 pages, $45**

The Golf Course
by Geoffrey Cornish and Ron Whitten

Much of maintaining a golf course is understanding why the course was built the way it was. This beautifully illustrated book presents the ancestry of golf courses and golf course architects.

The introduction by Robert Trent Jones says the book finally gives credit to those who were responsible for innovations in the game and the design of courses. One of the highlights of the book is a course by course list of golf course architects and designers and their background.

As a superintendent, you might ask why you need a book about architects. After reading this book and enjoying its photos of historic courses, you will understand why.

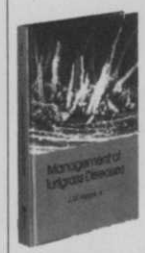
320 pages, $35

Turf Irrigation Manual
by James Watkins

Next to the land and buildings, the irrigation system is the most valuable asset of a golf course. It only makes sense to have a strong reference to help you maintain and repair this expensive and complicated system.

Watkins, with more than 40 years of experience in irrigation design and operation, wrote this book as both an educational tool and a problem solver for irrigation designers and contractors. After reading this book, you'll know as much about irrigation as the people who put your system in.

360 pages, $22.95



Management of Turfgrass Diseases
by J. M. Vargas

Diseases are perhaps the most complicated pests superintendents have to deal with regularly. Vargas has made great effort to simplify and clarify turf diseases and their control.

In addition to simplified explanation of cool- and warm-season turf diseases, Vargas devotes 35 pages specifically to managing turf diseases on golf courses.

Vargas covers all factors of turf disease, including soil, turfgrass varieties, irrigation, drainage, mowing and other pesticides. Get a step ahead of diseases by learning more about them. And when they do occur, you'll need a reference that explains the solution simply and clearly.

208 pages, $24.95

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Associations add money, support to research

The United States Golf Association Green Section is the leader in low water use, minimal maintenance turfgrass research funding.

This year alone, it has made a $332,000 commitment for research and a $3 to $4 million commitment within the next eight to 10 years.

National Director William Bengeyfield says research has become one of the Association's main goals.

"We have formed a Turfgrass Research Advisory Committee to direct a long-range program to develop minimal maintenance turf for golf," explained Bengeyfield. "Lower water use, use of effluent for irrigation and breeding are all included." All of the projects are long-range, especially the breeding program which is a 10 to 20 year project.

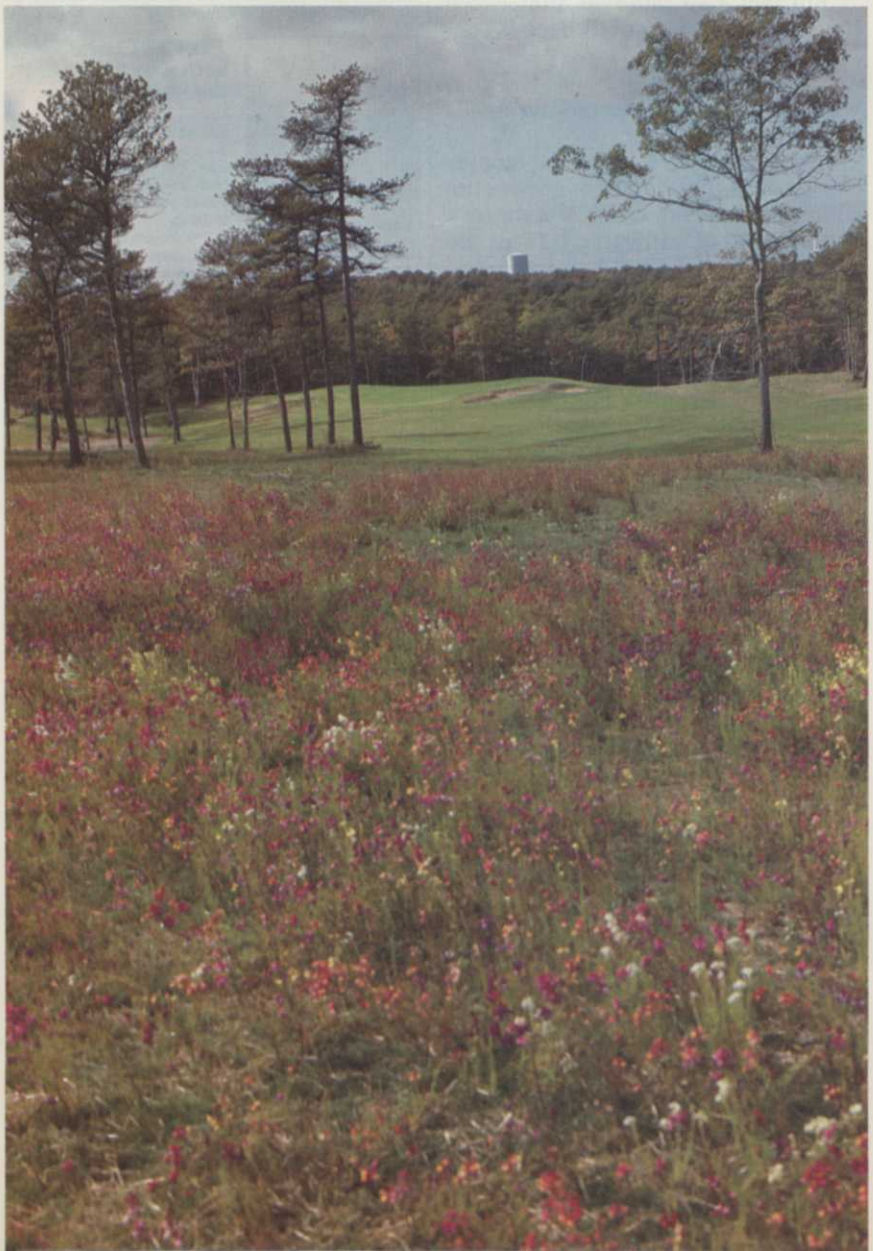
The nine member Advisory Committee, made up of researchers, association personnel and others involved in golf, meets four or five times a year to discuss progress, problems and other related matters.

Besides funding individuals at various universities across the country, the USGA has brought together a computer data base research library at Michigan State. Under the direction of Dr. Richard Chapen, director of libraries at MSU, the library is attempting to bring together all available information on turf research ever printed.

"Eventually the library will be developed so that extension personnel and superintendents can tap into the library for all the latest information," says Bengeyfield.

Bengeyfield credits former National Director Al Radko with conceiving and implementing the original project.

"It was really Al's vision from the beginning."



A brush burial site *is planted with wild flowers near Hole No. 16 at Dennis Highlands golf course on Cape Cod. Golf course architect Michael Hurdzan used flowers to reduce maintenance, lower water consumption reduced mowing and minimium fertilization requirements.*

American Society of Golf Course Architects

Dr. Michael J. Hurdzan, president of the American Society of Golf Course Architects and a partner in Kidwell & Hurdzan, Inc., Columbus, OH, is very aware that people are looking to his profession to find many golf course-related water saving answers.

"Although golf courses appear to use a lot of water, they don't really because of the area they cover," explains Hurdzan. "Because of the evapotranspiration rate, courses can lose up to 1/4 inch of water a day."

Hurdzan estimates an average 18-hole course can use up to a million and a half to two million gallons per week to irrigate tees, greens and fairways, depending on the weather of the area.

"There are ways to conserve on greens which are the highest water-use areas," he says. "How the substructure of the green is created makes a difference." The three substructures Hurdzan referred to are the Purr-Wick (P.A.T.) system, the USGA method and the Modified Greens Construction method.

Selection of cultivars can be another area of water savings.

At Dennis Highlands, a course in Cape Cod, MA, that Hurdzan's firm is working on, he was confronted with high, sandy soil, water from an underground aquifer and a community very aware and concerned about groundwater pollution.

Hurdzan used a seed mix of low nitrogen hard fescue and chewings fescue for the rough, since after the first year, almost no nitrogen would be needed and that would lessen nitro-

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gen escaping into the groundwater supply. Also, very little irrigation would be needed as well as little mowing.

"It also affords a different color and texture than the fairways."

For the fairways, Hurdzan used a bluegrass blend of about 15 percent Mystic, 15 percent Bensun, 15 percent Touchdown, 25 percent Ram I, 15 percent Jamestown chewings fescue and 15 percent Prelude ryegrass. This blend, too, is high in nitrogen and conserves water. The far rough areas are planted with wildflowers and sheep fescue.

Other water conserving areas were driveways being drained into a central pond and ornamental grass windbreaks such as Chinese silver grass, fountain grass and love grass.

"The time a golf course uses the most water is when it's being established," says Hurdzan. "New plants need a lot of water to grow. It's not uncommon to irrigate eight to 10 times a day. To conserve in this area, we use a straw mulch. It's expensive, as much as $500 an acre, but again, the benefits can be felt down the road—less erosion and water conservation benefits.

"Water conserving elements add initially more cost to a project, but the money is recouped later," concludes Hurdzan. "It's important to find clients who feel a certain stewardship to the earth."

Dr. Michael Hurdzan, *president of the American Society of Golf Course Architects, and partner in Kidwell & Hurdzan Inc., Columbus, OH.*

Golf Course Superintendents Association of America

The 5,000-member Golf Course Superintendents Association of America has been "aware of an impending crisis" for quite some time, according to President Jim Timmerman of Orchard Lake Country Club, Orchard Lake, MI.

"With the rate of new courses being built in the South and Sunbelt states, the water situation can only get worse," says Timmerman.

That crisis could come as quickly as within the next 10 to 15 years.

"When a water crisis does occur, one of the first industries to go will be recreational," predicts Timmerman. "We (golf courses) don't want a bad guy image. Golf courses are beneficial to the environment even in as much as they provide oxygen in the air."

The GCSAA has always supported turf research, ranging from $25,000 to $35,000 a year to various programs and researchers. They finally decided to put their resources into one, three year program under Dr. William Torello of the University of Massachusetts. He is doing tissue culture and genetic work leading to genetic manipulation of turfgrass cultures.

"We (irrigation industry) will probably be targeted first for any type of restrictions."

—Baron

Regional golf course superintendents' associations are also lending a hand.

The membership of Baltusrol Golf Club in Springfield, NJ, felt so strongly about the need for research that each member will donate $2 annually to the USGA Turfgrass Research Program.

"Hopefully, other clubs will see the same need," said Timmerman.

Members of the USGA Research Committee *are from left, Dr. Paul Rieke, of Michigan State University; James G. Prusa, GCSAA associate executive director; George M. Bard, USGA Executive Committee; Alexander M. Radko, USGA (retired); Monty Moncrief, Athens, GA; Dr. James R. Watson, vice president, Toro; Charles W. Smith, Club Managers Association; Dr. Marvin Ferguson, Texas A&M University; and William Bengeyfield, national director, USGA Green Section and chairman of the Research Committee.*

Irrigation Association

The Irrigation Association, headquartered in Washington, D.C. represents more than 1,000 irrigation equipment manufacturers, distributors, contractors and technical personnel involved in specialized irrigation.

They have put their effort into lobbying before Congress for tax incentives for those who convert to more efficient-type irrigation systems, thus conserving water.

Tom Schiltz of the Irrigation Association doesn't hold out much hope, though, at least with the Reagan administration.

"Basically this isn't going to happen with the current administration's stance on tax reform. It would never even entertain the idea of the kind of incentives we're talking about," Schiltz said. "There is a big problem ahead and if we (this industry) don't take care of it ourselves, the government will." **WT&T**

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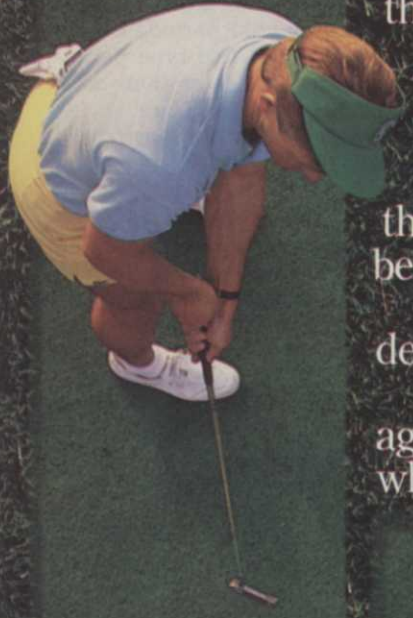

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Landscape Managers' Guide to:
Tall Fescues

by William A. Meyer, Turf Seed, Inc., Hubbard, OR

Tall fescue (*Festuca arundinacea* Schreb.) is becoming increasingly popular as a turfgrass in many areas of the United States. This species has been a very important grass for forage, roadside stabilization and erosion control for many years.

The increased demand for tall fescue for turf has resulted from escalating energy costs to produce fertilizers and pesticides, and water shortages in many areas, especially in the southwestern U.S. Compared to other cool-season grass species, tall fescue is unique due to its deep root system for drought tolerance or avoidance, the ability to persist at reduced soil fertility, and reasonably good tolerance to many pests.

The release of new lower-growing tall fescues starting in the late 1970's has increased the interest in tall fescues for turf.

Origin and history

Tall fescue is a native of Europe and is found throughout Europe, in Asia, eastern and southern Africa, Madagascar, southern Australia, New Zealand, and in large areas throughout the United States. It tolerates a variety of geographic and climatic conditions, which explains its wide range of adaptation.

This species, now found in most of the 50 states, was introduced in the early 1800's. Because of its morphological resemblance to meadow fescue, it was not classified as a distinct species until 1950, even though it was already being widely used for forage, conservation and roadsides.

The utilization of tall fescue increased a great deal with the development of the first improved cultivars from naturalized American tall fescues. Harry Schoth of Oregon State University developed and released Alta in 1941. Kentucky 31 (KY-31) was developed and released by the University of Kentucky in 1943. Both KY-31 and Alta were developed primarily as forage grasses, but have been used as turfgrasses.

By the 1960's, tall fescue was being recommended for turf by the state of Tennessee because of its wide adaptation to variable soil pH, rainfall and sunlight.

Until recently, KY-31 has been the most widely used and recommended cultivar for turf, especially in the transition zone of the United States, where other cool-season grasses are not well-adapted and the warm-season grasses are sometimes killed by the cold. This transition zone includes an area south of central Illinois, east of Topeka, KS, north of Macon, GA, and west of the Atlantic coastal plain of the Carolinas. Both Alta and K-31 have been used in the southwestern U.S., especially in California and at higher elevations in Arizona and Nevada.

KY-31 has produced a better turf quality than Alta in most turf trials. In the transition zone the common practice for turf managers is to reseed KY-31 lawns each year to maintain denser stands.

Growth characteristics

The tall fescues live up to their name when they are allowed to produce seedheads, growing as tall as 4-5 feet.

Tall fescue is basically a bunchgrass, but limited rhizomes can be seen on certain plants, especially when they are grown in light, sandy soils. Breeding work is in progress to develop varieties with increased rhizome production. Thick stands of the present varieties can produce a tough sod if sufficient time is given for a mature turf.

In many northern lawns of Kentucky bluegrass, tall fescue can be a severe weed problem when single, coarse clumps are scattered in a turf area. The leaf blades of KY-31 and other common-type cultivars are generally a light-green color and coarse, with a harsh feel to the hand. Individual plants can be found in old turf stands that are finer-bladed with a softer texture and a reduced vertical growth rate when compared to KY-31.

Most breeding programs to develop improved turf-type varieties have been based on selections from old turf areas that have the ability to develop a denser, finer-bladed turf with improved persistence. The tall fescues usually slow up their growth and go dormant during cold periods earlier than the improved turf-type perennial ryegrasses and later than most Kentucky bluegrasses. Their spring green-up rate is also intermediate to these other two species.

Breeding turf-types

The main disadvantage of KY-31 and other older tall fescue varieties is they produce a coarse open turf with a light green color. Dr. C. Reed Funk initiated a breeding project at the New Jersey Agricultural Experiment Station to develop tall fescue cultivars for turf purposes. Other breeding programs were started in the 1970's with some programs as cooperative breeding projects with Funk.

Rebel was the first turf-type released from the above programs, followed by Falcon and Olympic. The varieties have leaves approximately 30-40 percent finer than KY-31 and densities of tillers almost twice KY-31. They all have a darker blue-green color than KY-31 with improved persistence in turf. They also have improved disease resistance compared to KY-31.

In most turf trials at both high and low maintenance these new varieties have shown superior turf performance. Other turf-type varieties that have shown improved turf performance over KY-31 are Bonanza, Adventure, Jaguar, Apache, Arid, Mustang, Houndog and Finelawn I. It is interesting to note that some of the later maturing varieties (in seed production) such as Jaguar, Adventure, Bonanza and Apache have generally given superior turf performance than earlier maturing varieties. The varieties Bonanza and Apache possess the darkest genetic blue-green color of the present varieties, followed by Mustang and Olympic.

Disease resistance

The most common and serious disease of tall fescues are Rhizoctonia brown patch and net blotch (*Hel-*

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minthosporium leaf spot). Other diseases occur, but not as widespread as these two.

Net Blotch Under cool cloudy and wet conditions net blotch caused by *H. dictyoides* Drechs. can be found on tall fescues whereever they grow. In western Oregon this disease is especially severe on seedlings when mowing and traffic occurs during the establishment period. The symptoms are net like patterns of streaks of dark brown tissue on the leaves. When the disease is severe the leaves turn yellowish-brown and die back from the tips. The varieties Bonanza, Mustang, Jaguar and Olympic have shown the best resistance to this disease to date. Breeding programs in New Jersey and Oregon have shown that field selection in space plants can be used effectively to develop more resistant varieties.

Brown Patch Brown patch caused by *Rhizoctonia solani* Kuhn is a very serious disease of tall fescue. This disease is most severe under hot and humid conditions when the turf is subjected to long wet periods. High fertility, close mowing and poor air circulation increases the severity of this disease. Breeding programs to develop cultivars with increased brown patch resistance have been promising to date. Among the new turf-type varieties, Adventure, Jaguar and Bonanza have shown the best resistance to date. Many of the cultivars from Europe and the varieties Alta, Goar and Fawn have been damaged more severely than KY-31 or the new improved turf-type cultivars.

Brown patch can also become more severe when drought stress precedes humid conditions favoring disease development. Varieties that have improved resistance to drought stress generally show less damage from this disease.

Some varieties are able to recover from brown patch injury better than others. Most varieties recover very rapidly as soon as cool, favorable growing conditions occur. Breeding programs are in progress to develop higher levels of brown patch resistance in new varieties of tall fescue.

Adding five percent by weight of Kentucky bluegrass to a tall fescue turf has shown promise to reduce the development of brown patch. Care must be taken to select bluegrass varieties with only moderate aggressiveness to prevent crowding out of the tall fescue by bluegrass.

It is interesting to note brown patch is not as serious a problem in arid areas of the Southwest as in the transition zone.

Pythium Blight Various species of pythium can destroy seedlings or mature turf of tall fescue when weather conditions are similar to those favoring brown patch. This disease, called Pythium blight, is usually most severe in poorly drained areas and can rapidly deteriorate turf quality if conditions for disease activity persist for more than a short period.

Koban or Apron fungicides are effective to control Pythium blight as seed treatments. A change in weather conditions to cooler temperatures and reduced humidity will usually halt the development of this disease.

The level of resistance in the present cultivars is questionable considering the number of pythium species involved. Adventure and Falcon had somewhat less disease in a New Jersey trial in 1983.

Crown Rust During cool spring and fall periods crown rust caused by *Puccinia coronata* cda. can occur on tall fescues in many areas of the U.S. The yellow orange pustules are urediospores of this fungus and in the late fall the crown-like teliospores (hence the name) can occur. Tall fescue is generally more resistant than meadow fescues. Progress has been made in selecting varieties with improved resistance in Western Oregon. Alta and Fawn are quite susceptible while KY-31 and most of the new turf-types are quite resistant.

Powdery Mildew Some of the new turf-type varieties which develop very dense leaf canopies in seed production fields have been found to be susceptible to powdery mildew. This disease is usually restricted to the dense center parts of each plant that is severely shaded. It appears that most of the present varieties can be affected when excessive foliage is produced in the springtime. From space plant observations it appears that breeding for improved resistance to this disease is possible. Powdery mildew has not been noted in shade trials to date.

Heat, drought tolerance

Tall fescue is a very deep rooted species which helps to tap water resources deeper in the soil profile than the other cool-season species. In Nebraska studies by Kopec and others, in two-inch mowed turf they found roots of the new turf-type varieties 48-inches deep and roots of KY-31 54-inches deep. It is encouraging to see that the roots of these denser and fine textured varieties are maintaining rooting depth comparable to the more open and coarser KY-31.

In 1981 studies in western Oregon, the varieties Olympic and Falcon were still maintaining 80 percent or more green color after 70 days of drought compared to 67 percent for hard fescue, 32 percent for chewings fescue, 44 percent for creeping fescue, 40 percent for perennial ryegrass and 16 percent for Kentucky bluegrass.

In water use studies the tall fescues have been found to have a higher water loss rate that most other warm season grasses and some of the cool season species. This high water loss rate has a beneficial cooling effect during heat stress periods as long as the roots can reach available water reserves.

Most of the present varieties of turf-type tall fescues have shown similar response to drought and heat stress to KY-31. Attempts to develop an extremely dwarf and fine variety (similar in texture to turf-type perennial ryegrass or Kentucky bluegrass) have resulted in problems with reduced drought and heat stress and increased disease problems. These very fine and dwarf clones are being crossed with well-adapted varieties with higher levels of summer disease resistance.

Extreme soil conditions

Tall fescues are able to grow on a wider range of soil conditions than other cool season species. The new turf-type varieties are able to maintain much better density at low fertility than KY-31 at low fertility. The darker colored varieties are more striking at low fertility levels.

Tall fescues have above average tolerance for acidic, alkaline, saline and poorly drained soils. In California trials the varieties Olympic and Jaguar showed improved resistance to iron chlorosis than other varieties.

Shade tolerance

Many of the new turf-type varieties, especially those with improved net blotch resistance, have shown improved shade tolerance over KY-31. All of the varieties become finer and softer in shade, which makes tall fescue more compatible in mixtures with other species.

In shade situations, the tall fescues can be found very far south because of the cooling effects from the shade.

Cold tolerance

In trials on the high desert of eastern Oregon the tall fescues have shown very good cold tolerance in space plantings when compared to all of the perennial ryegrasses over four winters. In New Jersey, Pennsylvania and Rhode Island the well-adapted varieties have suffered winter damage under severe ice sheet conditions. The cold hardiness of tall fescues is reduced when they are heavily fertil-

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Tall Fescue Varieties

A brief description of the tall fescues presently available or becoming available in the near future.

Adventure tall fescue was developed by Pure-Seed Testing, Inc. of Hubbard, Oregon. It will be distributed by Warren's Turf Nursery. Adventure is an advanced generation synthetic variety derived from selections from old turf areas in the northeastern U.S. It has performed very well in turf trials throughout the U.S. both in full sun and partial shade. Adventure is an attractive, vigorous, leafy, turf-type variety with a medium dark green color, medium-fine leaf texture and good density. It has shown greater vigor and better color at low fertility levels than other tall fescues currently available. Adventure has good resistance to Rhizoctonia brown patch and moderate resistance to net blotch disease. Seed became available in 1983.

Alta tall fescue was developed by the Oregon Agricultural Experiment Station with the cooperation of the Agricultural Research Service of the United States Department of Agriculture. It was released in 1940. Plants were selected out of two introductions from Germany and one commercial seed lot on the basis of improved winter survival, ability to remain green during dry summers in western Oregon, high forage yields, and ability to persist. Alta has heen used extensively for turf in California. It produces a rather coarse, upright turf of moderately low density and rapid leaf elongation. Alta has shown above average susceptibility to net blotch and Rhizoctonia brown patch in turf trials and crown rust in western Oregon. Alta is a commercially available variety.

Apache tall fescue is a new, moderately low growing turf-type variety with a dark blue-green color when compared to most other varieties. This variety was developed by Pure-Seed Testing, Inc. and will be marketed by Turf-Seed, Inc. It is an advanced generation synthetic variety derived from selections from old turf areas in New Jersey, Georgia and Illinois. Apache has shown moderately good resistance to net blotch, brown patch and very good resistance to crown rust. It has shown good density and a medium-fine texture with a reduced rate of leaf elongation. It has shown good traffic, heat and drought tolerance in trials to date and good color retention at low fertility. Commercial seed will become available following the 1984 harvest.

Astro tall fescue is a new, moderately low growing variety developed by Pure-Seed Testing and marketed by Green Seed Co. It is an advanced generation synthetic variety developed from parental clones selected from old turf in North Carolina, Illinois and New Jersey. This variety has a medium dark green color with medium texture and density. Astro has shown moderately good resistance to net blotch, crown rust and brown patch and good heat, cold and drought tolerance and good persistence in turf. Commercial quantities of seed will be available after the 1984 harvest.

Bonanza tall fescue is a new, low growing turf-type developed by Pure-Seed Testing, Inc. and marketed by Cenex, Inc. This variety is a 3-clone synthetic derived from germplasm from New Jersey and Georgia. This variety has a very dark blue-green color when compared to other tall fescues and has a dwarfer, slow leaf elongation rate compared to other varieties. Bonanza has very good resistance to brown patch, net blotch and crown rust. The wear, drought, heat and cold tolerance of this dense variety has been very good in trials to date. It has shown good color retention at low fertility and will be available in very limited quantities after the 1984 harvest

Brookston was developed by North American Plant Breeders and International Seeds, Inc. It is produced and marketed by Stanford Seed of Buffalo, New York. Brookston is a leafy, moderately low growing turf-type tall fescue with a medium dark green color, medium texture and medium density. It is reported to have improved low temperature hardiness. Brookston has very good resistance to net blotch and crown rust. It has shown reduced summer stress tolerance. Limited amounts of seed became available following the 1983 harvest.

Clemfine was developed and released by the South Carolina Agricultural Experiment Station and Loft's Seed, Inc. It originated from germplasm selected from old turfs located in the southeastern United States. Clemfine has a medium green color, coarse texture, and a medium-low density. It has moderatley good resistance to Rhizoctonia brown patch, but only fair resistance to net blotch. Clemfine closely resembles Kentucky 31 tall fescue in many characteristics, but has generally shown improved performance and increased persistence in turf trials. Seed of Clemfine became available after the 1982 harvest.

Falcon tall fescue was developed cooperatively by Pure-Seed Testing, Inc. and E. F. Burlingham & Sons from germplasm obtained from the New Jersey Agricultural Experiment Station. The first certified seed was produced in 1980. Falcon is a leafy, moderately low growing, turf-type variety. It has the ability to produce an attractive, more persistent turf with finer texture and higher density than most of the currently available varieties of tall fescue. It has improved resistance to brown patch, crown rust and net blotch.

Fawn was developed at the Oregon Agricultural Experiment Station and released in 1964. It produces high seed and forage yields in the Willamette Valley where it shows greater height and vigor in early spring and earlier maturity than Alta or Kentucky 31. Fawn produces a coarse, open turf with a rapid rate of leaf elongation. It is susceptible to net blotch and Rhizoctonia brown patch diseases in New Jersey turf trials and to crown rust in western Oregon. Fawn also appears to be less winter hardy and less tolerant of adverse summer conditions than Kentucky 31.

Finelawn I is a new moderately low growing turf-type variety developed by Pure-Seed Testing, Inc. and marketed by Finelawn Lawn Research, Inc. of Madison, Georgia. This is an advanced generation synthetic variety developed from clones derived from old turf areas in Alabama, Georgia, Pennsylvania and New Jersey. This variety has shown moderately good resistance to net blotch, brown patch and crown rust. It has shown good drought, heat and cold tolerance. It became commercially available following the 1983 harvest.

Galway was developed by Northrup-King. It is a medium dark green turf-type variety with medium density and a medium coarse texture. The variety has good heat and drought tolerance and improved cold hardiness. It does well in light to moderate shade as well as in full sun. Galway has shown moderate resistance to Rhizoctonia brown patch and net blotch. Galway is a moderately low growing variety intermediate in growth habit between the turf-type varieties and Kentucky-31. Commercial seed production has been initiated.

Goar tall fescue was selected at the Imperial Valley Field Station at El Centro, California and developed in cooperation with the Plant Materials Center, Soil Conservation Service, Pleasanton, California and the California Agriculture Experiment Station. The parental germplasm was obtained from Hungary. It was released in 1946. Goar

continued on page 54

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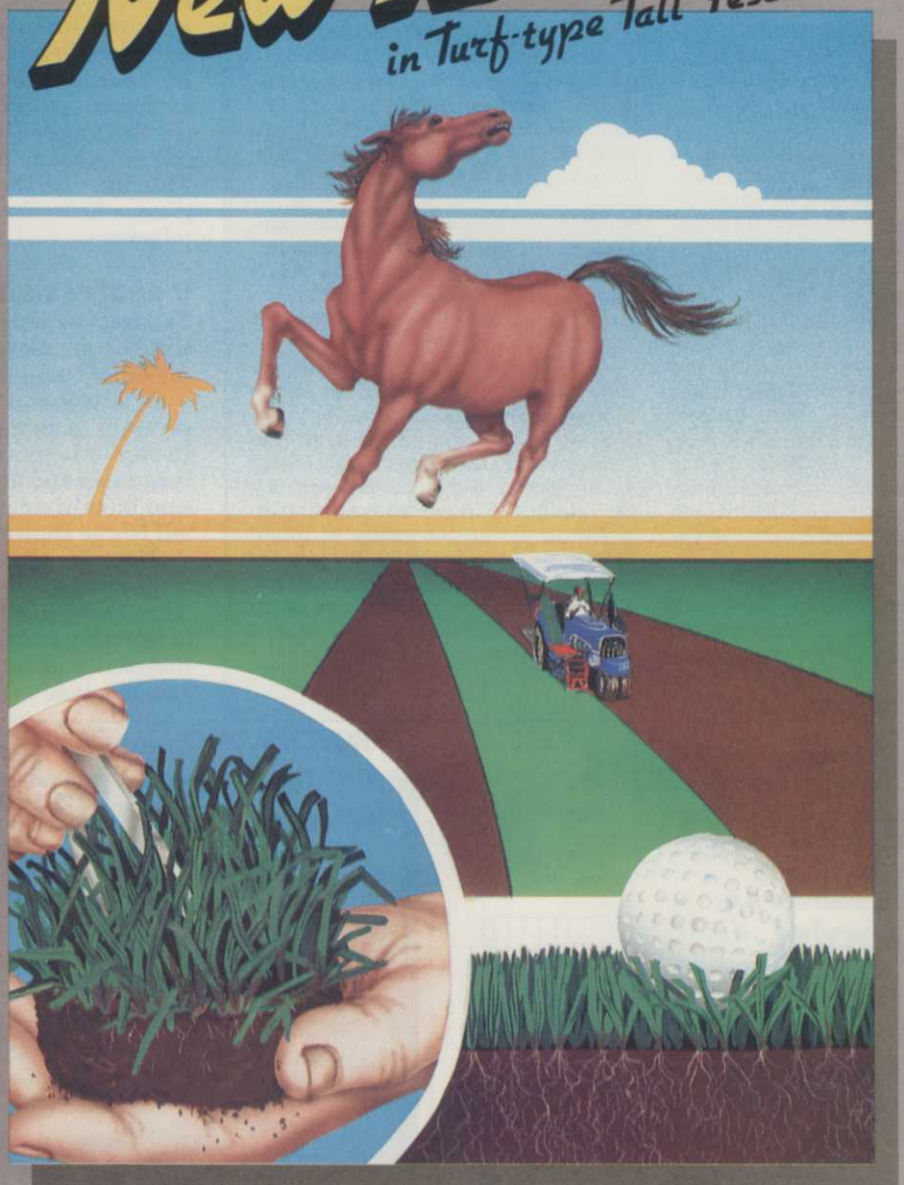

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is an early maturing, vigorous, rather coarse bunchgrass adapted to heavy textured alkaline soils. It is reported to show improved growth during high summer temperatures in California. Goar has performed poorly in turf trials with high susceptibility to Helminthosporium blight and Rhizoctonia brown patch. Goar is reported to be susceptible to crown rust.

Houndog was developed and released by International Seeds, Inc. of Halsey, Oregon. Its parental germplasm originated from plants selected from old turfs in Kentucky and Tennessee plus plants selected from Rutgers and Missouri. Houndog is a leafy, persistent, moderately low growing, turf-type variety with a medium dark green color, medium texture, medium density, and a semi-prostrate growth habit. It has good heat and drought tolerance, performs well in shade and shows good color retention in late fall. Houndog has moderate resistance to Rhizoctonia brown patch and net blotch and crown rust. Seed of Houndog became available following the 1983 harvest.

Jaguar was developed by Pure-Seed Testing, Inc. of Hubbard, Oregon. It will be distributed by Garfield Williamson, Inc. of Jersey City, New Jersey. Jaguar is an attractive, leafy turf-type tall fescue with medium density and texture, a medium dark green color and a moderately low growth habit. It has good heat and drought tolerance, good shade adaptation, and very good color retention with low temperatures in late fall. Jaguar has very good resistance to crown rust, Rhizoctonia brown patch and net blotch. It has done very well in trials Seed became available commercially following the 1983 harvest.

Kenhy tall fescue was developed cooperatively by the Kentucky Agricultural Experiment Station and the Agricultural Research Service of the United States Department of Agriculture. It was released in 1976. Kenhy is a synthetic of eleven 42 chromosome derivatives of annual ryegrass X tall fescue hybrids which were selected for vigor, soft lax leaves, and forage with high moisture content during drought stress. Kenhy has a lower stomatal frequency than Kentucky-31, which may contribute to its lower percentage of rolled leaves, greater palatibility, and greener foliage during summer drought stress. Kenhy produces a rather coarse, moderately open turf with a rapid rate of leaf elongation. It has shown improved

ized and mowed closely.

Traffic tolerance

In our wear trials in western Oregon and the Sports Turf Research Institute in Bingley, England, the new improved varieties such as Falcon, Adventure, Mustang, Olympic and Rebel have been found to have superior traffic tolerance than KY-31 and other common type varieties. The crowns of tall fescue are slightly deeper in the soil profile than perennial ryegrasses. This may be the reason why these grasses have shown improved traffic tolerance.

Insect resistance

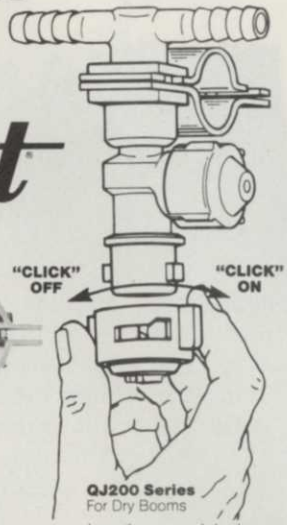
Tall fescues generally have better resistance or tolerance to insects than the other cool-season turf species.

In tests in western Oregon billbugs severely damaged many of the Kentucky bluegrasses, perennial ryegrasses and fine fescues. The adjacent plots of new and old varieties of tall fescue showed no damage.

There is a possibility that the endophyte, commonly referred to as *Epichloe typhina*, which has been found to convey insect resistance when it is present in perennial ryegrasses, is also involved in conveying insect re-

Change spray tips clean strainers in seconds... *without tools!*

New QuickJet system



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PROVEN MONEY MAKER **Olathe AERO-SEEDER**

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Employment Opportunity

Field Agronomist

The Milwaukee Metropolitan Sewerage District is seeking a Field Agronomist to participate in the Distribution and Marketing of Milorganite Fertilizer. The applicant must have a BS/MS in Turfgrass Science, which includes a strong curriculum in soil chemistry, and three years experience in sales extension or consultation activities.

The successful applicant will be involved in direct customer contact, distributor assistance, research and demonstration projects, and development of promotional programs. Skills in writing, public speaking, and communication in all sectors of the specialty fertilizer field are necessary.

The position requires extensive nationwide travel. Residence in metropolitan Milwaukee, Wisconsin is mandatory.

Submit resume and salary requirements to:

Stephen J. Inman
Manager of Employment & Staff Development
Milwaukee Metropolitan Sewerage District
735 North Water Street
Milwaukee, Wisconsin 53202

Milwaukee Metropolitan Sewerage District

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WHEN THE MOWING GETS TOUGH, THE TOUGH KEEP MOWING.

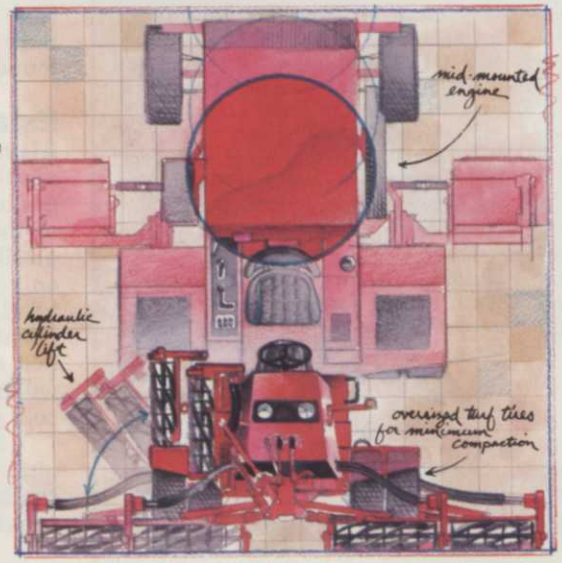
INTRODUCING THE REELMASTER™ 350-D.

You need a tough machine when you're tackling tough terrain. On bumpy ground. Over steep hillsides. Around obstacles. Through dense, wet grass.

You need the Toro Reelmaster 350-D.

It delivers all the power you need with a proven Mitsubishi 50 hp, 4 cylinder, water-cooled diesel engine. Yet this engine saves you time and money. It burns less fuel per acre than conventional gas engines. And it has no spark plugs or carburetor to maintain or replace.

The Reelmaster 350-D maneuvers easily, thanks to fast-responding power steering. And individual hydraulic cylinder lift raises the two outside mowers in a few seconds. So you can quickly narrow your cutting path around trees, traps, fences, flower beds, and other obstacles. Without slowing your pace.



While you're putting it through its paces, the Reelmaster 350-D handles well. No matter what the terrain. Its mid-mounted engine and wide stance create a low center of gravity. This, combined with even weight distribution on six oversized 4-ply tires, keeps you cutting even on steep hillsides. And allows you to transport safely and easily at speeds up to 15 mph.

In addition to all this, the Reelmaster 350-D gives you rugged Toro durability to keep you cutting years longer.

Call your Toro distributor to find out more about the new Reelmaster 350-D. The professional mower that's tough enough to keep mowing even when the mowing gets tough.

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Circle No. 142 on Reader Inquiry Card

tolerance of heat and drought and improved overall turf performance in Kentucky trials compared to Kentucky-31.

Kentucky-31 tall fescue originated as an ecotype selection discovered growing on the William Suiter farm in Menifee County, Kentucky, where it had apparently been growing since 1887 or earlier. The variety was collected, tested and developed by the Kentucky Agricultural Experiment Station and released in 1943. Kentucky-31 is very widely used for both turf and forage purposes in the lower midwest and upper south. It is adapted to a wide range of soil types and shows a better tolerance of climatic extremes than most other tall fescue varieties. Kentucky-31 produces rather coarse, moderately open turf with a rapid rate of leaf elongation. It has moderate tolerance of net blotch, Rhizoctonia brown patch and crown rust and it shows less damage from these disease than Alta, Fawn or Goar.

Marathon is a new, moderately low growing turf-type tall fescue with medium texture, density and a dark green color. This variety was developed by International Seeds, Inc. It was derived from elite parental clones selected in the transition zone of the U.S. Marathon has shown moderately good resistance to Rhizoctonia brown patch and net blotch and good resistance to crown rust. It has exhibited good heat and drought tolerance and is being marketed exclusively by Hubbard Seed Supply, Hubbard, Oregon.

Maverick was developed by Pickseed West Inc. of Tangent, OR, using germplasm from the USDA, Beltsville, MD. It is a moderately low growing, medium-fine textured variety with a pleasing medium dark green color. Maverick has better heat tolerance than most turf tall fescues and has very good shade tolerance. It is adapted to the upper south or transition zone and to low to medium turf management.

Mustang was developed by Pickseed West, Inc. of Tangent, Oregon, using germplasm obtained from the New Jersey Agricultural Experiment Station. It is an attractive, leafy, moderately low growing, turf-type variety with medium texture and density. The variety has very good shade adaptation and good fall low temperature color retention and spring greenup. It has shown very good resistance to net sistance to certain tall fescue varieties. This fungus normally produces no external symptoms and lives only within the tissues of plants by growing between the cells. It is transmitted from one generation to the next by seed. After seed has been stored for two years or more usually the percentage of seeds with viable endophyte goes down to very low levels.

Many of the new turf-type varieties of tall fescue have been found to have low percentages of infection in their seed lots, while KY-31 has been found to have levels over 90 percent.

Establishment

It is very important that quality seed be used to produce quality turf. Seed that has been certified with a seal and tag on the bag should be used when ever possible. Usually certified seed costs only 5-10 percent more than uncertified, and the consumer can be confident he is getting seed of a variety that the breeder has described. This will help to avoid varietal substitution, poor germination and low purities.

It is also important that there are no objectionable crop (such as orchardgrass, bentgrass, *poa trivialis* and ryegrass) or weed (annual blue-

continued on page 58

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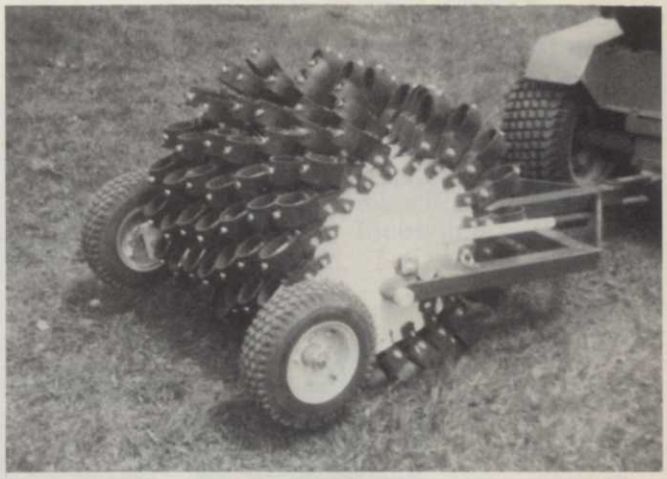

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A Powerful, Anti-Pesticide Lobby is Substituting Scare-Talk for Science.

You are the Target.

FACT: The overwhelming, supportable, verified conclusions of the scientific community find that pesticides are not an immediate, inherent, or significant danger to our society.

FACT: The obvious benefits of pesticides to mankind far outweigh any possible proven risk.

But sometimes facts aren't enough. A powerful, well-funded and growing coalition of self-appointed "public interest" groups are mounting an ever-accelerating attack on pesticides and their use. Lacking hard, scientific data to support their cause, they have substituted emotion, pseudo-science, and sophisticated media manipulation.

If they succeed, the result will be disastrous for our health and our economy. And if the use of pesticides is an important part of your business, you would most likely be out of business.

This is not scare talk. The threat is real.

Item: HR 3818, a proposed congressional amendment to FIFRA would devastate the pesticide registration process.

Item: Federal courts, by relying on National Environmental Policy Act technicalities, have banned governmental herbicide spraying.

Item: Recently introduced HR 5495 would tighten governmental procedures for changing pesticide tolerances and exemptions, and would authorize emergency action with respect to pesticides which "present an imminent hazard to the public health."

This threatening trend in national legislation, combined with the absolute explosion of state and local government pesticide regulatory efforts, could result in nothing less than an effective ban on pesticides.

What can we do about it? Plenty!

We must tell our story. We must reassert the benefits we gain from pesticides – disease prevention; pest-free hospitals, restaurants and homes; an agricultural industry that is the envy of the world; and an enjoyable environment.

That's why we're asking your support of 3PF – The Pesticide Public Policy Foundation. 3PF was organized in September, 1983, by the National Arborists Association, the Professional Lawn Care Association of America, and other interested affiliates. The goals of 3PF are straightforward:

- To identify, inform, involve, and educate those of us who recognize that pesticides are necessary and safe to use for health protection, environmental enhancement, and our nation's economic growth.

- To combat federal, state, and local regulatory initiatives that unreasonably or unnecessarily impact pesticide development and usage.

- To get the facts to the decision-makers, the media, and the public before the emotional momentum building against pesticides overwhelms all opposition.

To succeed, we need your help. It's that simple. And we need your financial backing. The groups seeking to cripple pesticide usage have vast financial resources to draw from. If we are to have any chance against this juggernaut we must have sufficient funds to put up a fight.

With all that's going on, I want to stand up for my rights! Send me more information on 3PF and what it can do for me and my business.

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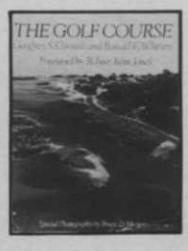

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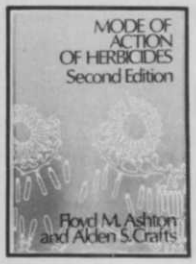

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Circle No. 112 on Reader Inquiry Card

TALL FESCUE *from page 52*

blotch, and moderately good resistance to Rhizoctonia brown patch. Mustang has good tolerance to close mowing with minimal thatching. Seed is commercially available.

Olympic was developed by Pure-Seed Testing, Inc. of Hubbard, Oregon using germplasm developed at the New Jersey Agricultural Experiment Station. It was released by Turf-Seed, Inc. Most of its parental germplasm was collected from old turfs in Alabama, North Carolina and New Jersey. The first certified seed was produced in 1981. Olympic is an advanced generation synthetic variety derived from the progenies of eight clones. These parental clones were selected from spaced-plant nurseries because of attractive appearance, freedom from disease, softness of leaves, ability to resist leaf roll during hot dry weather, dark green color, and promising seed yield potential. Single plant progenies of selected clones were evaulated in closely mowed turf trials in New Jersey and Oregon. Seedlings from clones showing the best progeny performance were screened for resistance to crown rust, uniform maturity, attractive appearance, and acceptable seed yield. Breeder seed was harvested from the remaining 1004 plants. Olympic is an attractive, leafy, persistent turf-type variety with a dark green color, medium texture and density, and a moderately low growth profile. It has good heat tolerance, performs well in moderate shade and has very good color rentention in late fall. It has good resistance to net blotch and crown rust and moderately good resistance to Rhizoctonia brown patch. It retains an acceptable green color at low nitrogen fertility levels. Olympic has shown less iron chlorosis than other tall fescues on alkaline soils in California. Commercial seed is available.

Rebel tall fescue was developed by Lofts Seed, Inc. from germplasm obtain from the New Jersey Agricultural Experiment Station. Plants collected from old turfs of New Jersey and surrounding states contributed most of the germplasm of Rebel. Additionally, part of the parental germplasm was obtained from a number of accessions received from the United States Plant Introduction program and from trispecies hybrids of tall fescue, meadow fescue, and perennial ryegrass obtained from the United States Regional Pasture Research Laboratory; University Park, Pennsylvania. Clones of the original accessions were initially evaluated in nurseries subjected to frequent close mowing. Single plant progenies of the most promising selections were subsequently subjected to three cycles of phenotypic recurrent selection for persistence, attractiveness, disease resistance, and performance in turf trials maintained at three-quarter-inch cutting height. Rebel is a turf-type variety

Subdue. The most effective fungicide against Pythium blight and damping-off.

Pythium weather. High temperatures, high humidity and high anxiety. Once Pythium takes root, it can destroy turf within hours.

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Subdue works both on contact and systemically.

Subdue fights Pythium blight and damping-off—as well as downy mildew (yellow tuft)—in two ways. On contact, Subdue destroys the fungi in the soil. Systemically, Subdue prevents disease from within grass plants. That's because Subdue is water soluble—easily absorbed by roots. So Pythium—and now, downy mildew—don't have a chance.

Subdue also controls costs.

Subdue's systemic action means longer, more effective residual protection. Fewer applications. Lower chemical costs. And savings in maintenance and labor. And Subdue's low application rate—1 to 2 fluid oz. per 1,000 sq. ft. for 10 to 21 days on established turf—makes Subdue the most cost-efficient protection you can buy.

Before Pythium weather strikes, subdue it. Use Subdue in a preventive maintenance control program. And get a good night's sleep.

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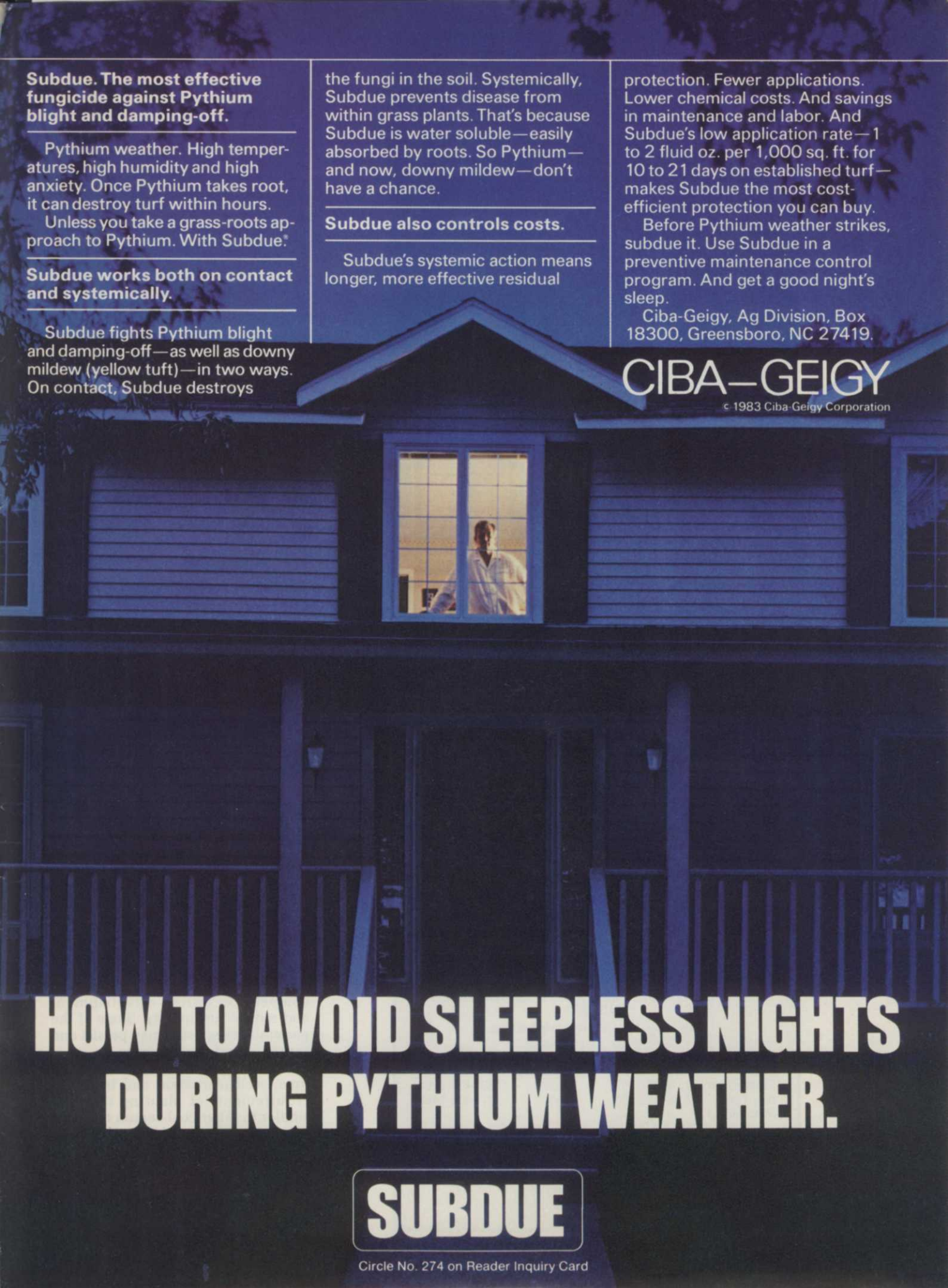

HOW TO AVOID SLEEPLESS NIGHTS DURING PYTHIUM WEATHER.

SUBDUE

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that has an attractive, leafy, persistent turf of greater density, finer texture, and a slower rate of vertical growth than most of the commercially available varieties of tall fescue. Rebel has improved resistance to brown patch and moderate resistance to net blotch. Rebel became commercially available following the 1979 harvest.

Tempo is a new moderately growing turf-type tall fescue developed by Agriculture Services Corp. from selections from old turf areas in and around Ocean Shores, Maryland. It has a medium green color with medium texture and density. Tempo has moderate resistance to net blotch with improved drought tolerance. Selection was made for plants with narrower leaves and a slower rate of vertical leaf growth. Commercial seed will be produced and marketed by Normarc, Inc., Tangent, Oregon and will be available Fall of 1984.

Willamette is a new moderately low growing turf-type tall fescue with an attractive moderately dark green color. It has a medium texture and density and was developed by International Seeds, Inc. Willamette was derived from elite clones selected from old turf areas in the midwest and mid-southern U.S. It has shown improved resistance to brown patch and crown rust and moderate resistance to net blotch. This variety has also shown improved heat, cold and drought tolerance and will be marketed by Willamette Seed and Grain Co., Albany, Oregon. □

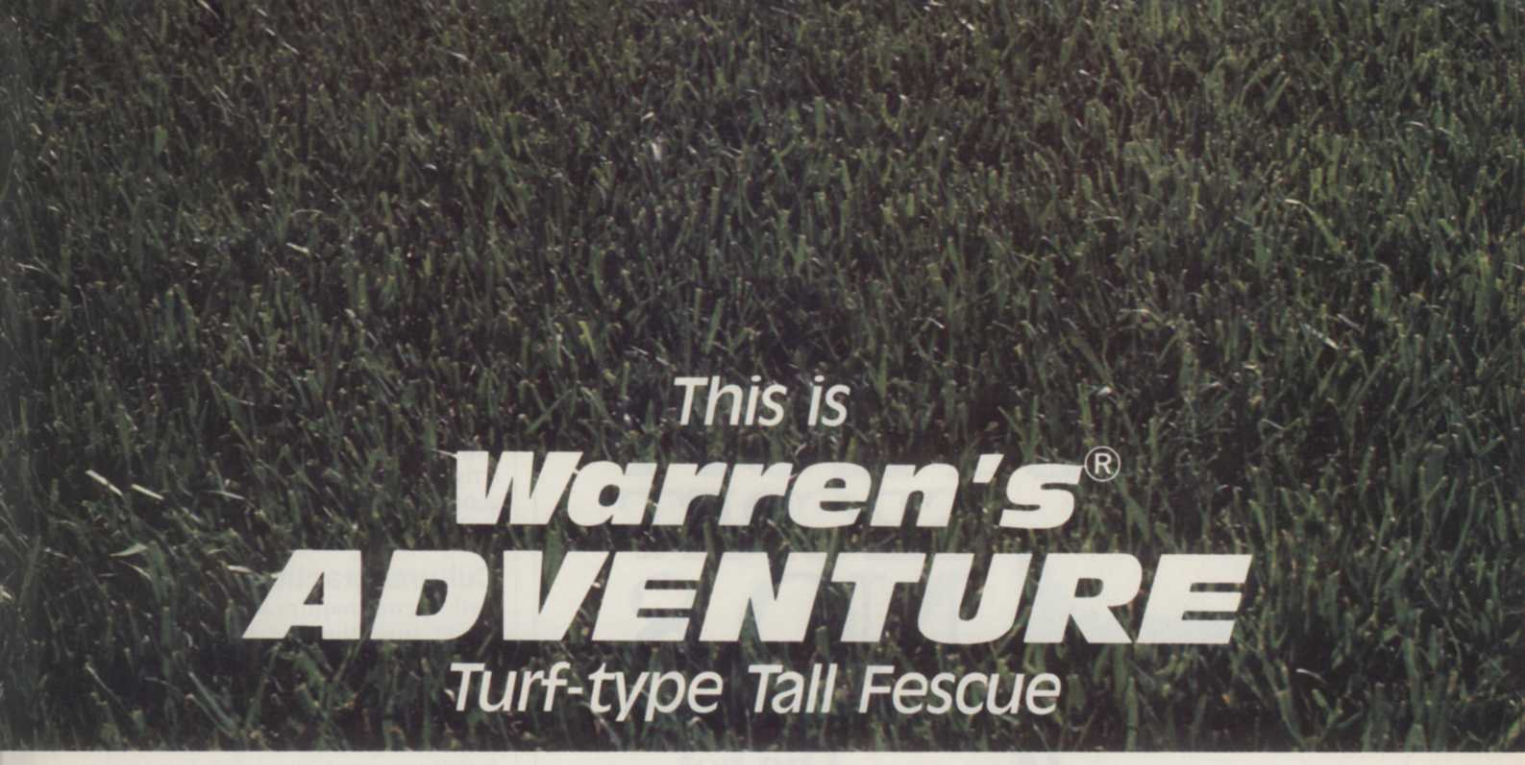
grass or velvetgrass) seeds in a lot.

Most of the KY-31 is grown as a by-product of pastures in Missouri. Much of the seed from this production contains orchardgrass or other serious contaminants of tall fescue turf.

Much of the seed produced in western Oregon is produced by professional seed growers and the quality is generally better than the southern production. The two contaminants that can occur in Oregon production are annual and perennial ryegrass. These ryegrasses can cause severe competition during establishment and reduce turf quality. Some of the perennial ryegrasses may persist and cause a clumpy appearance.

Ground preparation, soil fertility, lime, seed placement and irrigation requirements at planting time are similar to other cool-season turf species. The seeds should be placed at a depth of 1/8-1/4 inch. Rolling the ground after seeding aids in making good seed contact and makes the surface smoother. The surface must be kept moist until germination occurs.

When optimum conditions exist,



This is Warren's® ADVENTURE Turf-type Tall Fescue

Rated better than its top competitors.

9 = very best 1 = very poor

Variety	Turf Quality	Spring Color	Brown Patch Resistance	Pythium Resistance
Warren's® ADVENTURE	**6.8**	**6.5**	**7.8**	**8.0**
Apache	6.7	*	6.5	5.0
Mustang	6.6	*	6.0	6.3
Olympic	6.5	5.8	5.8	5.3
Jaguar	6.1	*	7.3	6.0
Rebel	5.9	7.4	6.5	6.0
Hound Dog	5.9	*	6.2	6.2
Falcon	5.8	5.6	6.3	7.0
Kentucky 31	3.4	4.0	6.5	6.8

*Not reported

Data from Adelphia and North Brunswick, New Jersey, 1980 thru 1983

No matter what demands you put on Warren's® new ADVENTURE Turf-type Tall Fescue — turf quality . . . color . . . density . . . texture . . . toughness . . . heat and drought tolerance . . . you can count on performance that's proven superior against leading competitors.

The finer blade of ADVENTURE provides a denser more attractive turf than the older unimproved varieties. It requires less water and fertilizer than Kentucky Bluegrass or perennial ryegrass and is suited for heavy shade conditions as well as full sun.

In comparisons to "cool season grasses" ADVENTURE survives much better in the "transition zone" of the U.S. where it is often very hot and droughty. Wear tolerance for athletic fields, especially in the transition zone, is far superior to the old tall fescues.

SPECIFICATIONS

Mowing Height	¾" to 1½" on irrigated turf. 2" on "non-irrigated" turf dependent upon rain only.	**Germination Time**	7 days is normal (at 70°F). Responds better in high soil temperatures than bluegrass.
Fertility Requirements	2-3 pounds of N per year per 1000 square feet. ADVENTURE is less prone to iron chlorosis than leading competition.	**Heat Tolerance**	Excellent. Far superior to ryegrass or bluegrass.
		Cold Tolerance	Much better than perennial ryegrass.
Seeding Rate	5-7 pounds per thousand square feet.	**Fungus Susceptibility**	Superior resistance to brown patch and red thread. No mildew seen in shade. Good crown rust resistance.
pH Tolerance	Ranges of 4.7 to 8.5.		
Shade Tolerance	Up to 80% shade at 2½" mowing height. The blade becomes narrower in the shade.	**Weed Resistance**	Denser than competitive brands. Very tolerant to herbicides particularly compared to creeping red fescue.

The superior performance and quality of Warren's® ADVENTURE has made it one of the leading brands of Turf-type Tall Fescue on the market. For more information, contact your Warren's® Turf Professional, Warren's® Seed Supplier, or call 1-800-828-TURF (8873). In California call 1-707-422-5100.

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sprouts of tall fescue can be observed in 7 days, with turf requiring the first mowing at 2-3 weeks. Seed rates of KY-31 are usually recommended at 8-10 lbs. per 1000 sq. ft. The turf-type tall fescues have increased tillering ability compared to KY-31 and seeding rates of 4-8 lbs. per 1000 sq. ft. can produce a very good turf. Higher seeding rates of tall fescue can be used to give a more rapid turf cover to compete with weedy species. High seeding rates can result in additional irrigation requirements to maintain good turf during periods of drought and heat stress.

Cultural practices

Tall fescues require less nitrogen fertilizer than the improved Kentucky bluegrasses and perennial ryegrasses. Sod growers in southern California have found that sod fields of tall fescue are managed best by cutting the fertilizer rates used for Kentucky bluegrass sod by one half. An annual fertility program of 2-4 lbs of actual nitrogen per 1000 sq. ft. is suggested. The optimum cutting height for tall fescues varies from one-and-one half to three inches depending on the amount of heat stress a turf will face. Cutting heights of one inch or lower can result in severe competition from annual bluegrass, especially under high irrigation and fertility conditions.

Tall fescues have shown good tolerance of the commonly used selective broadleaf and pre-emergence crabgrass herbicides.

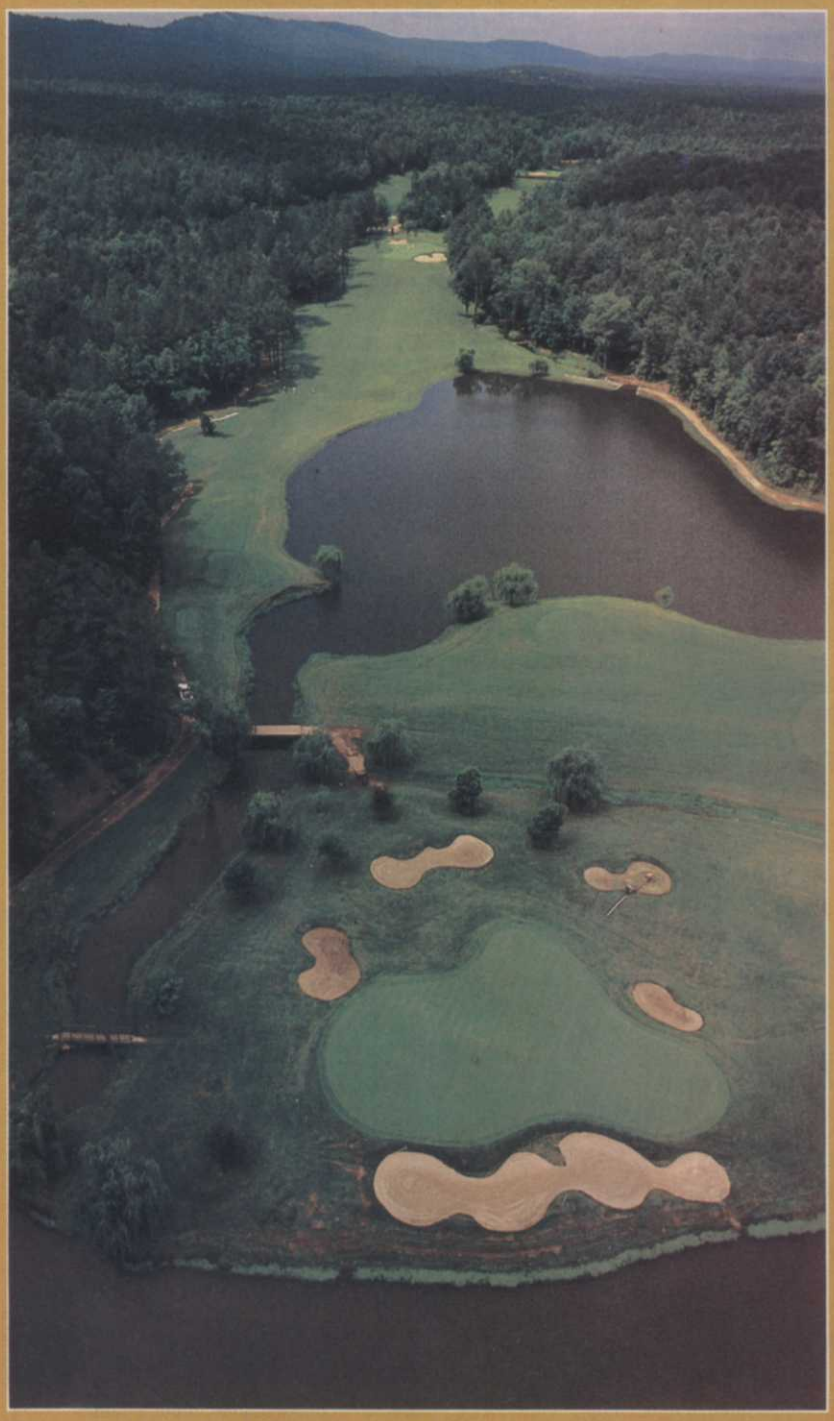
The tall fescues are not thatch formers like the bluegrasses and fine fescues and usually don't require dethatching.

Under western Oregon summer drought conditions the tall fescues will stay green and grow 3-4 weeks longer than Kentucky bluegrass and 2 weeks longer than perennial ryegrass.

Tall fescue varieties should be used in blends with other varieties of tall fescue or in mixtures with five percent Kentucky bluegrass. The variety of bluegrass used should have only a moderate level of aggressiveness to prevent crowding out of the tall fescue. This is especially important when the turf is mowed at one-and-one-half inches or loss. Mixtures of tall fescue with perennial ryegrasses and fine fescues have resulted in crowding out of alot of the tall fescue by these species in western Oregon turf trials.

There are many breeding programs in progress at this time to make further improvements in the levels of disease resistance and turf quality of tall fescue. **WT&T**

1984 PGA putts on PENNCROSS



18th green at Shoal Creek, Shoal Creek, Alabama

Shoal Creek, Alabama

At the rugged Shoal Creek course, host of the 1984 PGA Championship August 16-19, 1984, the touring professionals will again be putting on Penncross creeping bentgrass. Penncross and Penneagle, the Penn Pals, are no strangers to the pros. Most of the recent major championships have been played on one or the other. The Western open at Butler was played on Penneagle fairways and greens. The 1983 US Open at Oakmont was played on Penneagle tees, fairways and greens. Maybe you saw the sixty-foot putt on Penneagle.

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Circle No. 132 on Reader Inquiry Card

PROBLEM SOLVERS

By **Balakrishna Rao,** Ph.D **and Thomas Mog,**Ph.D

Bayleton is preventative

Problem: *I recently heard that Bayleton would prevent Fusarium blight, but could not cure it. Is there more research on this subject? (Michigan)*

Solution: Mobay's technical representative indicated that Bayleton will work best as a preventative when applied about 30 days before the incidence of disease and followed up with a second application after 30 days. So far, it has not shown any curative action and no additional research is being planned.

Yellow oxalis is stubborn

Problem: *I manage a four-acre property and have tried to get rid of yellow oxalis growing within mesembryanthemum for some time with only spotty success. We have sprayed magnesium sulfate, Roundup and others and have only killed the flowers and stems, but not the bulbs. Can you recommend a herbicide and/or application procedure that may help stop this perennial from reoccurring. We believe our pest is Oxalis pes-caprae (Bermuda buttercup). (California)*

Solution: Oxalis sp. is considered to be one of the more difficult to control broadleaf weeds. Reports suggest that application of herbicides, such as Trimec Turf Ester, Weedone DPC or Professional Turf Herbicide 123, can provide satisfactory control of yellow woodsorrel (Oxalis stricta).

Since you are not very sure about the Oxalis species you are dealing with, I would suggest applying and determining the efficacy of the products on Oxalis sp. in a small area before using it in larger areas. The following information should help you to verify the species.

The Bermuda buttercup (Oxalis pes-caprae syn. O. cernua) is a winter-blooming weed. It is the only tender, yellow flowered, stemless Oxalis in cultivation that has clusters of flowers; others have solitary flowers. It has scaly bulbs, a deep, thick tap root, and very long-stalked leaves with three obcordate leaflets fringed with hairs. Flowers are about 1-1 1/2 inches wide and bright yellow.

Herbicide application should be made during early spring or late fall when the weeds are actively growing. Repeat application may be necessary for satisfactory results. These herbicides contain ester formulation of 2,4-D which can volatilize and may cause injury on non-target, desireable plants. Therefore, be careful while applying these around ornamental plants. Read and follow label specifications for further details.

From asphalt to turfgrass

Problem: *At my place of employment we are planning an expansion of turf and/or landscaping in areas formerly covered by asphalt. Are there any precautions that should be taken, such as soil replacement, to avoid possible contamination of the root zone by oils or residues having leached into the subsoil? If so, how deep should the soil be replaced from these areas for trees (probably oak) and turf? (Indiana)*

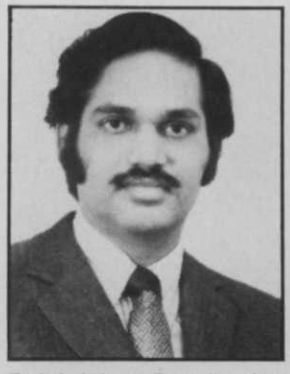
Solution: In an area which was formerly covered by asphalt, I would suggest that you take the following precautions before establishing any turf or landscape plants.

First, try to find out whether any total control (nonselective) herbicides were used in the area before the asphalt was laid. If so, depending upon the product and rate of application, the materials may still persist. If the materials are known, have the soil tested for residual concentrations which would affect the growth of plants.

If information concerning herbicide use cannot be determined or as a further precaution, I would suggest that you perform a radish and ryegrass seedling bioassay either directly in the field or in the laboratory using the soil in question. Sample the soil at various locations and depths. Testing soil to a depth of 10 inches is usually sufficient unless herbicide residues are found.

If herbicide residues or oil are found, the removal of 6-10 inches of soil is usually sufficient to replace the affected soil. Add new topsoil and till into the underlying soil.

If necessary, add topsoil in layered increments, tilling between layers. Planting the trees in a mound of soil above grade will provide further protection from traces of herbicide in the soil. If the bioassay tests indicate that the soil is free from contamination, then pursue the soil improvement, planting, etc., based on soil test results and recommendations which can improve the soil.



Balakrishna Rao is plant pathologist and Thomas Mog is pest management specialist for Davey Tree Expert Co., Kent, OH.

Questions should be mailed to Problem Solver, Weeds Trees & Turf, 7500 Old Oak Boulevard, Cleveland, Ohio 44130. Please allow 2-3 months for an answer to appear in the magazine.

The Professional Lawn Care Association of America 1984 Conference & Trade Show November 12-15, Tampa, Florida

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NOVEMBER 12-15

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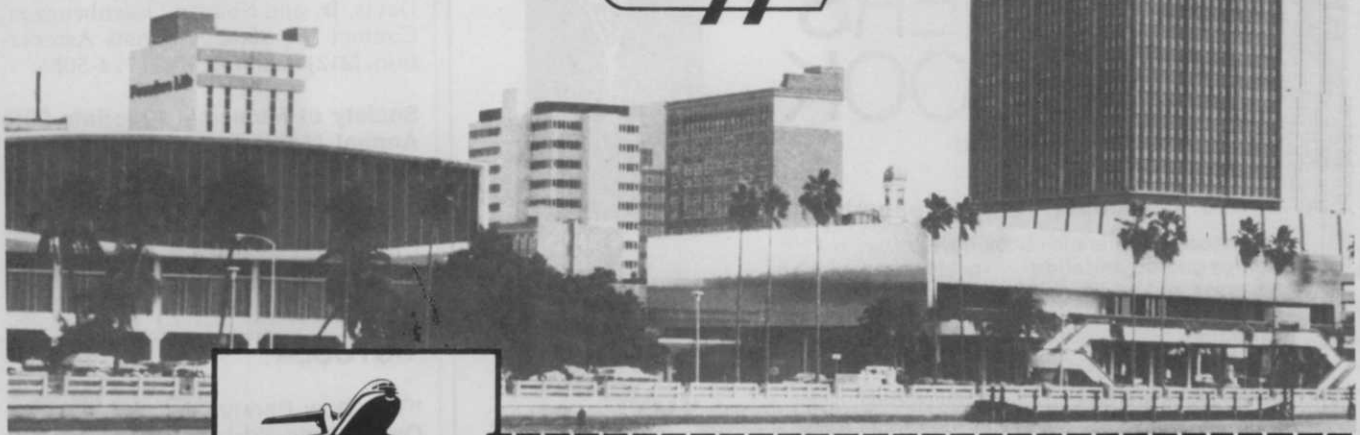

Delta Airlines have been appointed official carrier for PLCAA '84. Delta has regular scheduled flights from most major US cities to Tampa and will be offering discounted fares to all PLCAA '84 participants — **up to 30% off regular prices.**

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EVENTS

SEPTEMBER

International Garden Horticultural Industry Association Convention, Sept. 7-10. New Orleans, LA. Contact IGHIA, 26 Pine St., Dover, DE 19901.

Pacific Horticultural Trade Show, Sept. 6-8. Los Angeles Convention Center, Los Angeles. Contact California Association of Nurserymen, 1419 21st St., Sacramento, CA 95814, (916) 448-2881.

Ohio State University Field Day, Sept. 11. OSU Turgrass Field Plots, Columbus, OH. Contact Dept. of Agronomy, OSU, Room 202, 2021 Coffey Rd., Columbus, OH 43210-1086; (614) 422-2002.

Virginia Turfgrass Research Field Days, Sept. 18-20. Virginia Tech, Blacksburg, VA. Contact J.R. Hall, Agronomy Dept., Virginia Tech, Blacksburg, VA; (703) 961-5797.

Minnesota Society of Arboriculture, Sept. 24-25. Minnesota Landscape Arboretum. For information, contact MSA, 403 East Center St., Rochester, MN, 55904.

Tree Evaluation Clinic, Sept. 25-26. West Point, NY, conducted by the American Society of Consulting Arborists. Guest lecturers are Spencer Davis, Jr. and Sharon Ossenbruggen. Contact NY State Arborists Association, (212) 986-1160, (914) 724-5065.

Society of Municipal Arborists 20th Annual Meeting and Trade Show, Sept. 30-Oct. 3. Freehold, NJ. Contact Dave Shaw, 20 Court St., Freehold, NJ 07728 or Robert Miller, Exhibits Chairman, 7447 Old Dayton, Rd., Dayton, OH 45427.

OCTOBER

"The New Perennials" Symposium, Oct. 1. New York Botanical Garden. Contact Cindee Howard, NYBG, Bronx, NY 10458.

16th International Bedding Plants Conference, Oct. 2-6. Grand Rapids, MI. Contact BPI, PO Box 286, Okemos, MI 48864.

To insure that your event is included, please forward it, 90 days in advance, to: WEEDS TREES & TURF Events, 7500 Old Oak Boulevard, Cleveland, OH 44130.

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The next time you want to know something in the green industry, give them a call. If you can't reach them at the office, don't worry. They'll reach you in the pages of ***WEEDS TREES & TURF.***

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The Sunburst floating aerator cleans up algae, aquatic weeds, and unpleasant odors by adding dissolved oxygen and circulation to water. A product of Barebo, Inc., makers of Otterbine Spray Sculpture Floating Fountains and Aerators, the Sunburst is pre-assembled at the factory and shipped ready for installation. It is

said to be easily installed by two men in one hour. Each unit is a self-contained compact unit requiring no foundation, external pump, or plumbing fixtures. The Sunburst-ST is especially designed for tough conditions such as saltwater, alkaline waters, and high temperatures.

Circle No. 160 on Reader Inquiry Card

Orthene approved for turfgrass use

Orthene Tree & Ornamental Spray has received EPA approval for use in the control of turfgrass insects. It is registered to control many species of armyworms as well as sod webworm, leafhopper, and greanbug. Orthene is compatible with most commonly used fungicides and is not phytotoxic to the turf. Chevron Chemical Co. said the spray can be applied without protective equipment or clothing, and workers can re-enter the turfgrass area as son as the spray deposit has dried.

Circle No. 161 on Reader Inquiry Card

Mowers can gang up on really big jobs

Heavy-duty commercial Bunton gang mowers cut from 52 inches to over 20 feet, and are independently powered so they are easy to pull, even with small tractors. Each unit is powered by an 8-hp engine. There is a choice of up to five units, and the mowers can be transported in tandem with an overall width of only 53 inches. A unique hitch and back-up bar makes hitching quick and simple, and allows

tight turning and reversing. These mulching-type mowers are said to cut heavy grass faster and mulch clippings smaller.

Circle No. 162 on Reader Inquiry Card

Herbicide gains greater versatility

New label registrations for Devrinol preemergence herbicide allow the herbicide to be used on a greater variety of ornamentals including birch trees, dogwood, forsythia, ivy, camellia, sedum, and xylosema. The herbicide can also be applied to flowers such as dahlias, petunias, daisies, and gladiolus. Devrinol controls over 35 weeds including crabgrass, goosegrass, sandbur, foxtail, common chickweed, common purslane, and lambsquarters. The new registrations include the 50 WP and the 5-G formulations of Devrinol.

Circle No. 163 on Reader Inquiry Card

Blow debris away with attachment

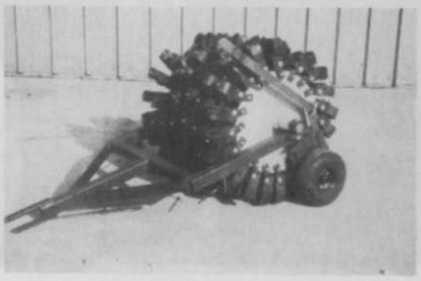
Olathe introduces its Model 67 Leaf and Debris Blower to blow leaves,

grass clippings, sand and debris off paths, fairways, and parking lots quickly and efficiently. The Model 67 attaches to the Toro Groundsmaster 72 to create a hurricane force wind which can be channeled either direction with a directional chute controlled from the operator's seat. The heart of the Model 67 is a 24-inch diameter fan driven by the Groundmaster's P.T.O.

Circle No. 164 on Reader Inquiry Card

Terracare offers small aerifier

The Tiny Terra 140 aerifier being introduced by Terracare Products can operate in small areas. It features an overall width of only 34 inches and an aerating width of 22 inches. The Tiny

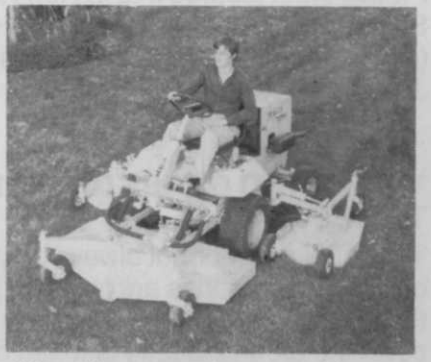


Terra, which can be pulled by an 11-hp tractor, features 140 tines, available in either 1/2-in. or 5/8-in. sizes with a spacing of 3 1/2 to 4 inches.

Circle No. 165 on Reader Inquiry Card

Turf Blazer mows acres per hour

The Turf Blazer 727-104 can cut up to 5.3 acres of grass per hour with its 104-inch cutting capacity. Its design, with a 60-inch mower out front and two hydraulically-operated wings, provides the floatation of a 60-inch ma-



chine. The mower is powered by a 747 Tractor with a field-tested, 3-cyclinder, water-cooled, 27-HP diesel engine in conjunction with hydrostatic transmission.

Circle No. 166 on Reader Inquiry Card

PLANTING HOLE *from page 20*

significantly increased growth compared to no fertilizer in the clay loam (unamended) soil.

The authors concluded that there is no substitute for good soil. The trees in the good clay loam soil produced an average of 69 inches of new growth with a stem diameter of 3/4 inch. In contrast, the trees in the silt loam subsoil averaged 12 inches and less than 1/4 inch. No benefit was derived from the use of soil amendments with either soil. Pine bark as an amendment proved detrimental to growth in both soils unless fertilizer was added to compensate for the nitrogen depletion by micro-organisms.

In 1976, Whitcomb et al. raised the question "What is a $5 planting hole? How much peat should fill it?"

The authors added 10, 20, 30, 40 or 50 percent by volume of peat, pine bark, vermiculite or colloidal phosphate to the soil removed from the planting hole. *Pittosporum tobira*, Japanese pittosporum, was the test plant.

Peat was not significantly better than the existing (native soil) at any rate. Again, the roots of the plants grown in amended soils were restricted to the original planting holes while plants in unamended soil had roots well beyond the planting hole. This was true whether or not irrigation was applied.

From a practical standpoint plants with confined (restricted) root systems will not withstand stresses (drought, nutrition) as well as plants with extensive root systems which "mine" greater volumes of soil.

Corley (1984) in Georgia reports on tests that have been conducted since 1975 on the effects of backfill amendments. Azalea, rhododendron and dogwood, three plants that require considerable cultural care, and juniper and holly were tested.

The authors concluded that there is no substitute for good soil.

None of the five plant types responded positively to backfill amended with pine bark during three growing seasons. The growth of azalea and dogwood was reduced by the amendments but the reductions were not significant.

For the professional landscape manager the implications of this research should be obvious. It is not necessary to add amendments to the backfill soil and in certain cases may be detrimental to do so. The apparent interface between existing soil and amended backfill soil prevents root growth into the native (existing soil). This results in a bathtub effect.

Dig a wide hole, not a deep hole, in native soil. Place the plants to the depth it was grown in the nursery. It is always better to plant slightly high than too deep. Most of the feeder roots (70-90°) are in the top 6 to 12-inches of the soil.

The results of these studies are too geographically broad-based (Minnesota, Oklahoma, Georgia, Florida) and consistent to be ignored. If followed the resultant plant growth and survival will be enhanced. In addition, labor, time and money should be saved in the planting process.

In 1981, the American Rhododendron Society altered its planting recommendations, omitting the suggestion that organics be added to backfill. Had someone suggested something like this 15 years ago they would have been discharged from horticulture. Times do change. **WT&T**

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3½ GAL. (15 K)
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Weight #	11	11.4	12.1
Tank Capacity	2.6 gals.	3.9 gals.	5.2 gals.
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SALES POSITION-Landscape firm seeks sales personnel with 1-3 years minimum experience in Landscape Installation sales in the Dallas-Fort Worth metroplex. Position involves no design or job supervision.Interested individuals should send letter and resume c/o 2559 Southwell, Dallas, Texas 75229. Interviews will be arranged upon receipt of resume. 8/84

CREWCHIEF:Park District has a new leader position for trimming, planting, and removal of trees. Must be experienced with rope and saddle; year-round position with full benefits. Send resume and salary experience to: Glenview Park District, 2320 Glenview Road, Glenview, IL. 60025. 8/84

USED EQUIPMENT

Ford 6600 Tractor with Mott Interstate Mowing System, Ford LCG Tractor, Exc. Cond. Low hours. Farne Landscaping, 215-646-2096, 2090. 8/84

1975 Woodchuck Chipper 16" 330 Ford V8, good condition. $4,500.00 or best offer. (914)462-4042. 8/84

1981 Finn Banton straw blower. Like new. Howard hydro 180 mover 1980. John Deere 1050 with loader, excellent condition. Valley Turf, Inc., Grafton, Ohio (216)575-0172. 8/84

For Sale--Finn Eagle Straw Blower, diesel motor. Manual controls, automatic feed. Good condition. $7,500. Myers Companies, Inc., Stilwell, KS (913)681-2667. 8/84

HYDRO-MULCHERS AND STRAW BLOWERS New and used. **JAMES LINCOLN CORPORATION,** 3220 S. Jupiter Rd., Garland, TX 75041. (214)840-2440 (TX), (800)527-2304(except TX) TF

HI-RANGERS AERIAL BASKETS 65', 57', and 53'. Skyworkers aerial baskets 65', 50', 40'. Vermeer stump cutter 1560.6. Vermeer tree spade 66, TS 44. Asplundh bucket and brush chippers, Bean sprayer, 9 ton trailer. Parkway Tree Service, 12026 W. Cherry, Wauwatosa, Wisc. 53226. (414) 257-1555. TF

For Sale — 1978 Princeton Sod Harvester, Model #4020, with John Deere diesel. Ready for work! Looks good — Runs Good! $17,500. Grass Farm, Morgan Hill, CA. (408) 226-9775. TF

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DIESEL HI-RANGER TOWERS—48-100 Feet working heights. Daily, weekly, monthly rentals with or without operator. MATLOCK LEASING, Pottstown, PA (215) 326-7711 or (800) 345-7711. 12/84

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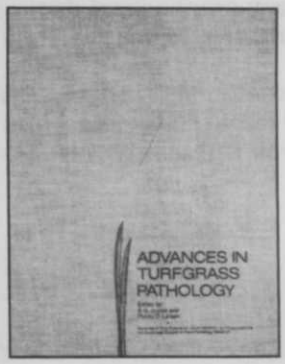

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A spirit of compromise

For over a week the radio waves in Cleveland crackled with the promotion of an event which promised to turn the floor of Municipal Stadium "into a mud pit" with fire-breathing monsters and a vehicle called "Big Foot" that crunches cars with the same fervor you stomp out cockroaches on a kitchen floor.

This is the kind of action we Americans love. Lots of hoopla, good old, dirt-flying, down-home fun.

That it also attracted a gaggle of concerned local media came as no surprise. The concern over the anticipated abuse to the baseball playing field was healthy.

Promotors of the event, anxious to demonstrate they were taking precautions to protect the turf, invited the media to Municipal Stadium to watch the track being built. What became most obvious—along with the hundreds of sheets of plywood and approximately 4,500 tons of dirt—was a spirit of compromise.

No, the floor of the Stadium was not being turned into a "mud pit." In fact, the two, 30-by-250 dirt tracks were confined to the foul areas, barely touching the playing field, and then only in the right and left field corners.

Stadium Maintenance Director David Frey used the opportunity to test a geo-textile ground cover which, covered with layers of plywood and tons of dirt, would lessen the pressure on the grass and allow it to breathe.

After the dust had settled and the tons of track hastily removed, Frey was not at all displeased with the conversion of the Stadium floor from baseball field to motor event back to playing field again. A single 4-ft-by-18-in. roll of sod was needed to repair assorted nicks and dings in the turf. The field would be ready when the baseball team returned the following week.

It's a simple matter to point the finger of blame without all the facts, to begin heating the tar and shaking the pillows into a fluffy pile of feathers.

Often such drastic action is unwarranted.

The bottom line in the operation of a stadium, as it is in any successful business, is the dollar. To remain profitable a stadium has to attract sizeable crowds even though it might involve stretching the capabilities of an athletic field. The turf manager shares in this reality and, as Frey emphasized during Cleveland's recent experience, it's an excellent opportunity to learn by aggressive planning and action.

It demonstrated again that when proper concern is shown and proper care taken, facilities, even those with something as seemingly fragile as turfgrass, can bring entertainment to those of us with many tastes, even if it involves trucks that eat other trucks.

Ron Hall

by Ron Hall, assistant editor

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	PTO HP		
L235	19	3	Mechanical shuttle-shift
L245 HC	21*	3	Standard
L275	23	3	Mechanical shuttle-shift
L305	26	3	Standard
L345	29	4	Standard
L355 SS	29*	4	Hydraulic shuttle-shift
L3750	36*	5	8 x 8 or
L4150	40*	5	Hydraulic shuttle-shift

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Touchdown	0.0
Sydsport	0.5
Plush	2.0
Baron	3.0
Cheri	3.5
Victa	3.5
Geronimo	4.0
Majestic	5.0
Bonnieblue	6.0
Adelphi	6.5
Vantage	6.5
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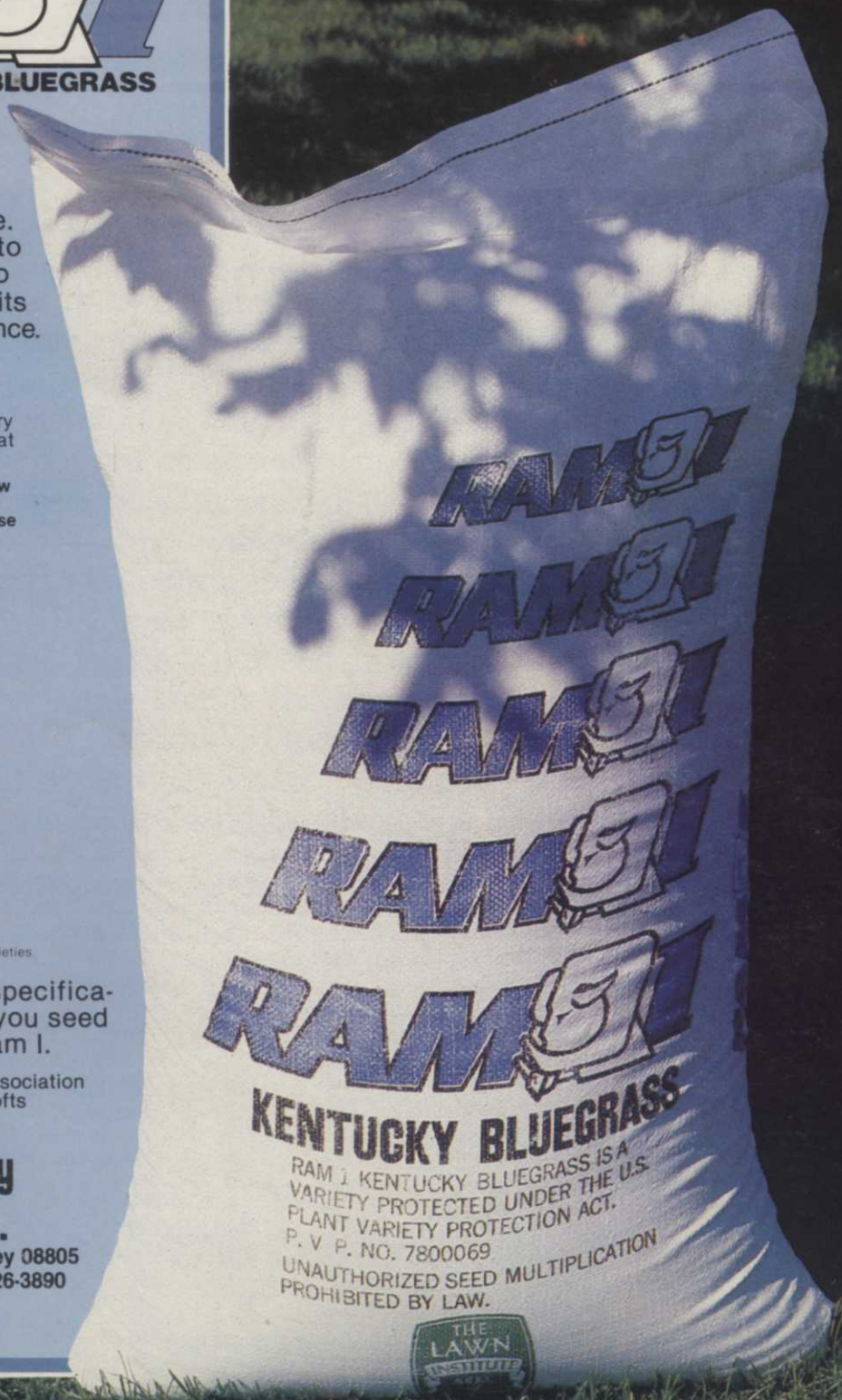
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